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MEDICAL FACTS AND FALLACIES*

BY

MAURICE E. SHAW, M.D., F.R.C.P.

ASSISTANT PHYSICIAN AND VICE-DEAN OF THE POST-GRADUATE COLLEGE, WEST LONDON HOSPITAL

In the first Aphorism of Hippocrates it is written that experience is fallacious or, to be more accurate, there appear the Greek words ἡ δε πεῖρα σφαλερὴ. The exact meaning of these words is open to discussion, as they have been variously rendered into several tongues. The accepted Latin translation is "experimentum periculosum," and Sprengell, whose English translation appeared in 1708, evidently thought that the word experimentum should be literally translated as experiment: "to make experiments dangerous," he says. We may concede that the Father of Medicine would have disapproved of experiments on patients on other grounds than their danger, but experiment in the modern sense of the word was unknown in the fifth century before Christ; it is, I think, very doubtful whether Sprengell's rendering gives the true meaning of the Greek words. The French, taking Littré's translation as authority, say "l'expérience trompeuse"; but "expérience," like experimentum, may mean either experience or experiment. Nothing but the context can give the clue to the true meaning, and in this isolated sentence there is no context to help us.

The most recent translation of the Aphorisms which I have consulted—Jones's translation in the Loeb Classical Library—gives the rendering "experience treacherous (or deceptive)." Not entirely satisfied with this, I referred to Liddle and Scott, who give as the first meaning of σφαλερὸς, "likely to make one stumble." This seems to me as good a rendering as any, whether πεῖρα means experience or experiment, for neither of necessity leads us to the truth. Yet we must confess that when experience leads us astray or experiment makes us stumble the cause is our faulty interpretation of facts which would be clear if we had eyes to see. It is well, perhaps, to recognize that experience is not always an infallible guide, and that facts, apparently confirmed by experiment and observation, will not always stand the test of time. In diagnosis and treatment experience is unavailing unless that common sense, which has been said to be the least common of all the senses, is also brought to bear upon the problem. We frequently find that the facts which are accepted without question by one generation become notorious fallacies in the next. Bright's disease occurs to me as an example. Thirty years ago it seemed established that the various types of so-called Bright's disease were primarily diseases of the kidneys. To-day we are being led to the belief that the renal lesions are but a small part of the pathological changes which, in reality, involve a number of other organs, tissues, and functions.

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Empiricism and Rationalism

Modern medicine is built on a structure whose foundation is experiment. But the modern practitioner is still apt to base the practice of his art upon the philosophy of empiricism. Nor is this entirely a bad outlook, for unyielding rationalism is as harmful to medicine as intransigent empiricism. The young doctor, until his mind has been ripened by the rain and sunshine of experience, is usually a stubborn rationalist; he will believe nothing which cannot be fully explained by those exact sciences to which he has devoted so many years of study. The passing of time brings a change. Science and rationalism give place to art and empiricism, until finally there is a danger that the science be lost and only the art remain. This does not of necessity make bad doctors; but the best philosophy for the medical man is a blend of empiricism and rationalism. A balanced judgement is bred from a healthy scepticism, large-minded enough to be tolerant of things that cannot be clearly understood, combined with a desire for proof and an appreciation of the meaning of scientific evidence.

Doctors, as a class, are far too willing to accept as proof evidence of the most exiguous character. This is partly the fault of our training, for it is given to few to pass through the chastening fire of work in the research laboratory. It would sharpen our critical faculties if we could all spend a year entirely devoted to research. The field of pure knowledge might not be greatly enlarged, but we should emerge wiser men and better doctors.

The Importance of Doubt

The strict standards which the research worker must exact of himself have never been better expressed than in the famous passage from Claude Bernard's classical work on experimental medicine. He emphasizes the importance of doubt and scepticism even after a theory has been amply confirmed by experimental proof. He says:

"... dans tout raisonnement expérimentale, il y a deux cas possibles: ou bien l'hypothèse de l'expérimentateur sera infirmée, ou bien elle sera confirmée par l'expérience. Quand l'expérience infirme l'idée préconçue, l'expérimentateur doit rejeter ou modifier son idée. Mais lors même que l'expérience confirme pleinement l'idée préconçue, l'expérimentateur doit encore douter; car, comme il s'agit d'une vérité inconsciente, sa raison lui demande encore une contre-épreuve."

These words should be written in letters of gold not only over the laboratory bench but over the consulting room table. For, though it falls to the lot of few to be research workers, it is necessary for all of us to seek the truth and to distinguish fact from fallacy. The road to the truth is no easy one. It is certainly no modern

" by-pass " along which we can race and pay no heed to the posts that point the way. Rather is it a mountain path which must be climbed perilously on foot ; a way that is often blocked and over which we must many times retrace our steps before we find ourselves, if we ever do, at the summit. It is easy to rest half-way ; still easier to wander along the low-lying paths of the valleys. But if we wish for the clear and distant view which only the topmost pinnacle can give us we must work patiently upwards until the last obstacle has been surmounted, and then, indeed, the world will be at our feet.

But a search can hardly be successful unless we know clearly what it is for which we are looking. Our search for facts will be barren if we start without a clear conception of their nature. Now a fact is a theory which has been proved, and proof is a matter of evidence. The alleged criminal is assumed innocent unless the evidence of his guilt is overwhelming. The slightest doubt and the verdict must be " Not guilty." Medicine would do well to take a leaf from the notebook of the law. We are, I fear, too prone to find our prisoner guilty on evidence which no judge or jury would accept. Before we admit a fact as proven the evidence must be conclusive, and even when proof seems certain we must, as Claude Bernard has told us, still be prepared to doubt. For, as we have seen, what is proven fact to one generation may be patent fallacy to the next. We must never be so wedded to our facts that divorce is impossible.

Use and Abuse of Drugs

Nowhere in the whole realm of medicine is the conflict of fact and fallacy, and of empiricism and rationalism, more clearly shown than in the field of therapeutics, particularly in relation to treatment by drugs. Here is well illustrated the virtue of empiricism, for many of our most effective drugs were first used as traditional remedies by the country folk of many nations before the medical profession had anything to do with them. Digitalis is a notable example. In its early days it was a true old wives' cure for dropsy. Withering in 1776, having learnt from an old Shropshire woman of the virtues of the foxglove, tried it in his practice, and was convinced of its value. But he no more knew how it cured than he knew that dropsy was not a disease but a symptom of many diseases. Half a century passed by before Bright drew attention to the association of renal disease with albuminous urine, and so paved the way for a distinction between renal and cardiac dropsy. And we can afford to smile at Withering's disappointment at the failure of his foxglove leaves to cure a case of ovarian cyst—then regarded as a form of dropsy. The final demonstration of the specific effect of digitalin and certain allied alkaloids upon the disorder of cardiac rhythm which we now know as auricular fibrillation belongs to the present century. But tradition dies hard ; and we still find preparations of digitalis being used, if not for ovarian cyst, for conditions for which there is little evidence that it is beneficial.

Our textbooks of pharmacology are full of the ascertained actions of drugs upon experimental animals, in doses which could never be employed in medical practice. We should be cautious in assuming that a patient will react in the same way as an animal, or that a small dose will have the same effect as a large one. The fact that digitalis is a proven remedy for one relatively common disorder of the heart's rhythm has led to the unjustified assumption that it is a universal cardiac " tonic." It is widely used in pneumonia, but the evidence that it confers benefit upon sufferers from this disease is far from conclusive. In one large-scale experiment, adequately controlled, the mortality was strikingly higher in a group of digitalised pneumonic patients than in a similar group of cases from whom the drug had been withheld. I feel that group experiments of this sort in other acute diseases for which digitalis is commonly given might well give very comparable results. The rationalistic view of digitalis therapy at the present time is simply that it controls the ventricular rate, and thus restores circulatory efficiency, in auricular fibrillation alone. In other cardiac conditions its uses are doubtful, and outside the province of cardiology its benefits are quite unproved.

Even in its limited sphere, however, we must beware of a common error. It does not, as is often supposed, " cure " fibrillation ; nor should we, on theoretical grounds, expect it to have any direct effect upon the mechanism of a circus rhythm. Its action is quite distinct from that of quinidine, and, if fibrillation ceases during the administration of digitalis, the result is to be credited to nature rather than to the treatment.

A further instructive illustration of the use and abuse of drugs is furnished by quinine. Known apparently since the earliest times to the natives of Peru as a cure for ague, the cinchona bark was introduced into Europe by the Jesuits in 1632. Its universal application in the treatment of all fevers soon made it apparent that a certain type of intermittent fever was specially susceptible to its action ; and thus it was that Sydenham was able to distinguish what we now know as malaria from other types of febrile disease. But even at the present day we find quinine being widely prescribed for all manner of infective disorders as diverse as influenza and malignant endocarditis. Yet surely the truth is that (excluding its uses in obstetric practice) its place in the *Pharmacopoeia* is justified solely by its specific action on the parasite of malarial fever.

Medical Credulity

We often marvel at the credulity of our patients, but the truth is that we are almost unbelievably credulous ourselves. This weakness is quite naturally exploited by the manufacturers of drugs and therapeutic products who have enough acquaintance with psychology to know that we shall be impressed by the presentation of a remedy in pseudo-scientific language. I am afraid that most of them—there are a few distinguished exceptions—are not over-scrupulous as to the matter or the manner of their advertisements. But, just as our job is to treat our patients so theirs is to sell their wares, and we cannot blame them if they take advantage of our simplicity. " The ultimate proof," says the skilful advertiser, " lies in clinical trial." There follows a spate of testimonials from doctors of varying degrees of eminence (judging from their academic qualifications) all joining in a monotonous paean of praise based, as a rule, upon a single case in which the remedy has been tried. The failures are not mentioned, but it would be equally logical to attribute the failures to the action of the drug as the successes.

Credulity is not, however, the prerogative of our present age ; nor is it, I think, likely to grow less with the passing of the years. Many instances could be quoted from history, and it is interesting to speculate whether the credulities of the twentieth century will seem as fantastic to our descendants as to us seem those of our ancestors. As an example let me quote to you a passage from the life of Elias Ashmole, the seventeenth century doctor, scientist, and antiquary. " I took," he says, " early in the morning, a good dose of Elixir and hung three spiders about my neck, and they drove my ague away—Deo gratias." A century later we find Horace Walpole writing to his old school friend, Thomas Gray, the poet and author of the famous *Elegy*, in these words. " . . . Madame de Bouxols, Marshall Berwick's daughter, assured me that there was nothing so good for the gout,

as to preserve the parings of my nails in a bottle close-stopped." And this may serve to remind us that colchicum is still an empirical remedy the value of which few would deny, although it has as much scientific basis as the simpler expedient recommended to Walpole.

Judgement in Using Remedies

But in all seriousness it is clearly of the greatest importance that medical men should develop judgement in the use of remedies. This is not easy, as our experience is derived from clinical use ; and clinical experiment, in spite of what the advertisers tell us, is the one type of experiment which is most likely to lead us astray. Partly this is due to the fact that most clinicians are but poorly trained in experimental method. Partly to the wish being father to the thought ; for we never use a remedy without a hope that it will cure. But mainly, it seems to me, because such experiments must be largely uncontrolled and because we fail to give a proper value to a negative result.

Many of you will remember the failure of Martin Arrowsmith's experiment in Sinclair Lewis's brilliant novel. Sent to test a newly discovered plague serum on an island stricken with an epidemic, he starts to inject alternate patients so as to have an equal number of controls. Finding that the latter are obviously dying from being denied the serum which is saving the lives of those selected for treatment, he sacrifices his experiment to his humanity and deliberately spoils the fruits of years of patient research. All of us who try a clinical experiment of this nature may find ourselves between the same Scylla and Charybdis. Untreated controls are essential for scientific proof, but such controls may die for want of treatment. Clinical experiment involves the heart as well as the head of the experimenter, and his plan of work must be made to fit the practice of his art.

The Negative Result

But consider for a moment the value of a negative result. In expressing the results of our trial of a new remedy we are apt to say that we have tried it in a number of cases and in a few it has been successful. If the successes are only few we should rather say that in most cases it has been a failure ; for experiment should be democratic and the rule of the majority hold sway. A remedy which has only occasional successes to its credit is probably winning an unmerited reputation ; for genuinely successful agents yield successes which approximate to the 100 per cent. level. How often do we meet with a hyperglycaemia which fails to respond to insulin, a case of pernicious anaemia which cannot be controlled by liver therapy, or a myxoedematous patient whose metabolism will not be restored by thyroid gland? These are all proved remedies ; their results are therapeutic facts and their failures are negligible. There are other therapeutic products of this class, but a moment's reflection must convince us that their number is small ; and, further, that most of them are biological preparations rather than drugs in the strict sense of the word.

It is probably a safe generalization to state that there are no drugs that cure except in the domain of those diseases—mostly tropical—which are caused by protozoa. The exceptions to this rule are those substances which cure by what is now called " substitution therapy," and the disease which they cure can be classed among the deficiency diseases. Obvious examples are the use of iron in hypochromic anaemia and iodine in certain forms of non-toxic goitre. If we narrow the field to include only the microbic diseases we can, without fear of contradiction, assert that drugs with specific action are as yet unknown. Yet the faith of our patients in a bottle of medicine is still widespread, and the tradition that therapeutics consists in finding the right medicine for the disease dies hard. In America the faith in medicine has long given place to faith in the hypodermic syringe, and the doctor is pestered by his patients for what they tersely call " a shot in the arm." There, indeed, the pendulum has swung too far, and the new idol is worshipped to excess. Even in this country we have not entirely escaped, and we find drugs being given by the hypodermic route which would be more effective if given by the mouth. It is now well known that an adequate dose of iron cannot be given by any other method than by the mouth, yet the number of proprietary preparations of iron for injection therapy which are still on the market bears witness to the fact that the lesson of the last few years has not yet borne fruit.

Vaccine Therapy

The subject of hypodermic injection suggests that it may not be out of place to say something here on the subject of vaccine therapy. On this subject I would venture to remark that there seems to me to be no sound evidence to show that vaccines have any place in the treatment of acute or chronic infective disease. In my own practice the failures have been sufficiently numerous to justify the conclusion that they have exercised little effect on the progress of the disease ; and the few successes could be attributed to the *vis medicatrix naturae* with as much justice as to the effect of the injections. I feel sure that any impartial observer who studies his results with vaccines and gives at least equal value to the successes as to the failures must conclude that the case for vaccine treatment has yet to be proved. We may go even further ; for, inasmuch as the whole theory of the use of vaccines is that they are specific, there is less excuse for failure than there is with drug treatment or substitution therapy. And if salvarsan and its derivatives can, when properly used, yield as small a number of failures as they do there is little excuse for vaccine treatment if it falls short of this standard. But could anyone be found to maintain that the results of treatment with vaccines could be compared for success with the results of salvarsan treatment in syphilis?

The role of vaccines in prophylaxis is quite another matter. Here the percentage of success is high—so high that no unprejudiced observer could doubt their value in their proper sphere—for their application is by no means universal, even among the bacterial diseases whose cause is known. But, within its limits, the use of vaccines in preventive medicine may be claimed as one of the most clearly proven facts of our science.

Right Attitude Towards Remedies

At this point I am conscious that my hearers may be murmuring to themselves: " But you cannot apply research standards to medical practice. Are we to use no drugs or remedies which cannot show 100 per cent. successes?" If such thoughts are passing through your minds let me say at once that I have no wish to urge you to restrict your therapeutic practice to the class of remedies whose action is of proven benefit ; but rather that you should use all remedies with discretion and with scepticism.

The occasional success of a remedy is not necessarily due to its lack of specific action, for often we employ them upon groups of cases in which the precise diagnosis is not clear. If we may return to digitalis for a moment it will be obvious that its use for all varieties of dropsy will yield but a very moderate measure of success. But if we confine its use to cases of auricular fibrillation only, its failures become insignificant. There are still many

chronic diseases whose aetiology is obscure. Many of these are probably not diseases, *sui generis*, but groups of diseases with many symptoms in common. We may here remind ourselves that until recent times jaundice was regarded as a disease, whereas now we know that it is but a symptom arising from a great number of morbid conditions. And I think it is safe to conjecture that the large group of rheumatic diseases will, sooner or later, undergo a similar process of simplification, with the discovery of causes which are at present unsuspected. Just as we now know that so-called sciatica is the result of quite a number of different pathological processes so, ultimately, we may find that the various forms of arthritis will be classified into simple aetiological categories instead of being described mainly from the nature of their clinical manifestations.

The recent introduction of gold for the treatment of rheumatism will serve as a good example of what our attitude should be towards a new remedy. If it was specific for all forms of rheumatism it would not take us long to discover the truth ; but the results so far reported, while not entirely discouraging, have certainly not been comparable with the results of liver therapy in pernicious anaemia. It is, however, quite possible that there is one small and unrecognized group of rheumatic disorders for which gold salts are in fact specific ; but until we have the means to recognize these cases we can only continue to use the method without discrimination in the hope that the swings will give a return for what is wasted on the roundabouts. A remedy such as this may indeed serve to make clear for us the existence of a special type of rheumatism just as quinine was the means of differentiating malaria from the other types of fever. There is thus a place in medicine for the empirical use of new remedies if only we will remember that our proven remedies do, in fact, yield results approximating to the 100 per cent. mark, and if also we will always give at least an equal value to a negative as to a positive result.

Fact in Diagnosis

There we must leave the consideration of fact in therapeutics and turn for a moment to a survey of the problem of fact in diagnosis. Some of you may join with me in wondering whether there really is such a thing as fact in diagnosis. Certainly all will agree that the number of patients who leave our consulting rooms with a diagnosis both dogmatic and true is exceedingly small. In this age of elaboration it is hardly unfair to say that clinical diagnosis, unsupported by evidence from the laboratory or *x*-ray room, can never be absolutely certain ; for absolute certainty can only be achieved if there is no means of proving the contrary. How fortunate, compared with us, were our fathers! Faced with a case of obscure pyrexia they could make a confident and dogmatic diagnosis of typhoid fever, secure in the knowledge that nothing but necropsy could prove them wrong ; and if, indeed, the illness exceeded in its course the allotted span of typhoid, a change of front could be made with a minimum of loss to dignity and reputation. But who to-day would dare to say that a man had typhoid unless the serum had first been tested for its agglutinating power? And who could for long maintain a diagnosis of tuberculosis with the bacteriologist and radiologist ranged firmly on the other side?

It seems that fact in diagnosis—that is, a certainty as high as can be attained by the human mind—requires in nearly every case the collaboration of some other expert besides the clinician. This is not to say that the advice of such expert must be sought in every case. Fortunately in a majority of cases certainty of diagnosis is of academic rather than practical importance. Our patients are relatively uninterested in diagnosis. What they wish us to tell them is how to get well, and they will accept almost any name we choose to give for their disease, with a strong partiality for one derived from either of the dead languages. Our responsibility is to be sure that we are prescribing the proper treatment. If uncertainty of diagnosis leads to uncertainty of treatment the diagnostic field must be dug deeper. But when precision of diagnosis cannot yield fruit in the form of more suitable treatment we may safely leave the field untilled. A golden rule to follow when there is doubt in diagnosis—even after full investigation—is to choose the alternative which offers the greatest scope for treatment.

If it is seldom our fortune to achieve certainty in diagnosis it is still true that all diagnosis must be built upon a basis of many facts. In a simple case of pneumonia—which I choose because it is a disease where purely clinical methods yield practical certainty—our diagnosis is the result of deductions made from observed facts. The subjective ones are provided by the patient. But, objectively, it is a fact that the patient has pyrexia, that his chest is dull, that his breath sounds are tubular, and that his sputum is rusty. Here again our professional practice deserves comparison with a branch of the law. Criminal investigation, in its technique, has much in common with medical diagnosis. Both must remain anchored to facts, though we may cruise with discretion through a sea of theories. The art of the physician, as of the detective, is to make sound deductions ; and this is only possible if he is possessed not only of experience but also of a sufficiency of technical knowledge.

Deductions from Observed Facts

The deductions which we make from our facts yield results which vary in proportion to the number of such facts available. In the case of a patient with pneumonia, which I have used as an example, the facts are sufficient for a deduction which has but a small margin of error. Faced with a paucity of facts—as when pyrexia is the only objective sign of disease—we are in the position of a detective who has but a single clue to the perpetrator of a crime—say, the knife with which the murder was committed. Unless some further fact can be discovered there is nothing for it but to wait in the hope that the criminal may give himself away. In medicine we refer to this as " expectant treatment," and I have no doubt that Scotland Yard has some equally well-sounding phrase with which to calm the consciences of their baffled agents. But the desired event will only sometimes happen, and, more usually, the aid of science is invoked and the knife is scrutinized for finger-prints or the patient's blood examined for evidence of the infecting organism.

Just as the clinician may be misled by false deductions from observed facts (or from failure to observe them) so may his laboratory colleagues mislead him by falsely interpreting the additional facts which they may bring to light. The biochemist, the pathologist, the radiologist, none of them are infallible. If comparisons may be made between them I would suggest that their accuracy is in the order in which they have been named. This implies no criticism and no disparagement. The biochemist is rarely asked to give us more than simple facts, and, subject only to faults of technique, there can be no argument about these. The content of the blood in urea, sugar, calcium, or other substance is pure fact, and the blame is ours if we misuse it. The pathologist has a wider margin of error although much of his work, too, is purely technical. But the nature of an abnormal blood cell, the precise class in which an obscure organism should be placed, or the presence or absence of malignant changes in a histological section, are matters which call for judgement and experience. A false inter-

pretation may mislead the clinician as much as a correct one may help him.

If the radiologist comes at the bottom of the list it is merely because his is the youngest science. We have only recently emerged from the days when a skiagram was little more than a diverting and interesting episode in the investigation of a clinical problem. The progress of radiology in the last fifteen years is one of the most astounding features of modern medicine. But its accuracy depends as much on the interpretation of what is seen as on the technical perfection of the radiograph. Outside hospital practice the opportunities for studying radiographs are few. As a result, the average practitioner requires of the radiologist not only fact but theory. An accurate description of an abnormal shadow is not enough ; he needs to know what that shadow portends. The opinion of the radiologist is therefore often given a weight which he himself would deprecate, since he recognizes that the *x*-ray appearance can never completely override the results of clinical observation. But there is still an element of magic about *x*-ray work which deceives our patients into expecting diagnostic miracles and ourselves into placing too high a value upon its results.

In the sphere of diagnosis the pathologist has the advantage over the biochemist and the radiologist, for he has at his disposal a number of tests which may be regarded for all practical purposes as pathognomonic. The chemical laboratory provides us with many facts, but few of them are in themselves diagnostic ; while in radiology the interpretative faculty must be so widely exercised as to extend the potential fallacy of human error throughout its domain. When the pathologist sends us the result of a sero-diagnostic test, whether it be a Wassermann reaction or an agglutination, he is sending us the nearest thing to a ready-made diagnosis that is to be had in medicine. The discovery of a specific organism, whether it be a tubercle bacillus in the sputum or a meningococcus in the cerebro-spinal fluid, is more than a simple fact upon which a diagnosis can be made ; it is the completed structure of the diagnosis itself.

Reviewing the whole field of fact in diagnosis, I think we can safely assert that conclusive proof is rarely achieved by clinical methods alone. A degree of probability, amounting to practical certainty, may be reached by those who have the gift of accurate observation and sound deduction. But pathognomonic signs are rare in purely clinical diagnosis ; such as there are are mainly in the province of the pathologist. And while chemistry and radiology provide invaluable contributions to the diagnostic total, the one gives us facts few of which are in the strict sense diagnostic, while the other supplies information the truth or falsity of which depends largely upon the skill with which we interpret it.

Sources of Error in History Taking

Having considered the more philosophical aspects of fact and fallacy in medicine, I propose to devote my concluding remarks to a brief survey of some of the more obvious fallacies which beset us in our daily work. And, first, I would ask you to consider for a moment the histories supplied to us by our patients. We have all been brought up to believe that the first step in clinical diagnosis is an accurate history, and that examination should only be carried out after this has been obtained. If we follow this rule we must remember that the uneducated patient has but poor powers of observation, analysis, and expression ; and that the educated may have such command of language that he may be reluctant to spoil a good story by too strict an adherence to the truth. This was recognized by Pye-Smith, who, in a clinical lecture to students at Guy's Hospital in 1898, advised that examination should precede the taking of the history. The history was, he said, " comparatively unimportant. Your natural tendency is to lay too much stress on the history." He elaborated his point in the following words:

> " Again and again, without intention or wish to deceive, the history you get from hospital patients is so confused, so inaccurate, so involved, lapses of memory are so frequent, and they so mix up what they know with what their friends have told them and what the doctor has told them and what they suppose, that it needs the skill of an Old Bailey lawyer to get at the facts of the case. On the whole, you will economize time by examining the patient first and listening to his narrative afterwards."

While I do not suggest that we should take this advice too literally it does, I think, illustrate a fallacy into which we are all, from time to time, liable to fall. We depend, of necessity, upon our patients for the subjective phenomena of disease ; and if, as is frequent, objective findings are few we may have to base a clinical diagnosis on the patient's narrative alone. We must be prepared for inaccuracies in this, arising not so much from a deliberate desire to mislead as from inability to express in words the complex visceral sensations resulting from their disorder. A further source of error in history taking is the use of words which have one meaning for the patient and another for the doctor. Patients, I find, will often tell us that they " vomit," but will deny " being sick " ; or they may do neither of these things, but yet " bring up their food." To most of us there is no special distinction between being sick and vomiting ; but patients of the hospital class use words and phrases in senses which no dictionary would authorize. " Nausea," " palpitation," and " giddiness " are further examples of words which have an almost technical significance for doctors, but which are loosely used by patients to describe a great variety of curious internal sensations. Care should be exercised in interpreting symptoms, unless they are described in words whose precise meaning leaves no room for doubt.

Pallor and Anaemia

Even a perfect history is not an infallible diagnostic guide. There is no time for me to do more than indicate a few of the more common fallacies which confront me weekly in the out-patient clinic. The first to which I should like to direct your attention is concerned with anaemia—the most commonly diagnosed but the least frequently recognized of all diseases. Time after time patients are referred to hospital for " anaemia," and investigation shows that their red cells are normal in size, shape, and number, and that they contain a normal content of haemoglobin. The explanation of this simple fallacy is the failure to recognize that while all anaemic people are pale by no means all pale people are anaemic. My experience has been that most patients referred for anaemia have no anaemia ; and, conversely, that those who have anaemia are sent up with some other tentative diagnosis. They may be short of breath and are suspected of heart disease ; their ankles swell and kidney trouble is feared—especially if, as may well be the case, there is also a trace of albumin ; or they complain of undue fatigue, and reach the hospital with a request for an *x*-ray of their chest.

Many of these cases may be diagnosed clinically with a fair degree of accuracy if attention is paid to the colour of the conjunctivae and mucous membranes rather than to the skin. A snow-white skin may be nourished by a blood rich in red corpuscles and haemoglobin ; and such a skin may indeed be paler than that of a patient with a very definite degree of anaemia. This fallacy will seem obvious to many of you, but it occurs with such depressing regularity that I have thought it worthy of comment.

Fallacies in Diagnosis of Chronic Dyspepsias

The hospital clinic of the general physician, consisting as it now does very largely of the waste material from the special departments, is crowded with the race of dyspeptics, and from these we might harvest a rich crop of common fallacies. The first of these I put forward with some diffidence, as I incur a risk of being accused of anti-surgical bias. I hope you will accept my assurance that this is not the case when I assert my belief that peptic ulcer is a medical and not a surgical disease. By this I do not mean that such ulcers should never be submitted to surgical treatment; I am simply commenting on the rather surprising fact that a large majority of all cases of suspected ulcer are referred by their doctors to the surgical rather than to the medical clinics. The relative merits of surgical and medical treatment are outside the scope of my present subject, but I hope I may secure your consent to the proposition that cases of chronic dyspepsia of whatever type should *in the first place* be referred to a medical department.

Many of these cases of suspected ulcer are, in reality, suffering from non-ulcerative conditions of the gastro-intestinal tract. A frequent mistake in the diagnosis of these patients is the assumption that pain related to the taking of meals must be due to peptic ulcer. Many such pains are, in fact, not due to either organic or functional disturbance of the stomach, but to a disorder of the large bowel commonly known as "spastic colon." The pain in such cases is situated below the umbilicus, a very uncommon location for the pain of gastric or duodenal ulcer, which is remarkably constant and usually high in the epigastrium. The importance of accurate localization of abdominal pain cannot be exaggerated, and it is not safe to assume that a pain described as "in the stomach" is either epigastric in situation or gastric in origin. The word "stomach" is one of those to which I have referred as having one meaning for patients and another for doctors. The former employ it usually as a polite synonym for "belly." There is only one way to find out the precise location of a pain in the abdomen, and that is to ask the patient to indicate it with his finger.

"Acidity," "hyperacidity," and "anacidity" (or hypochlorhydria) are often held responsible for painful dyspepsia, but, in truth, these disorders of secretion are not common, and do not, of themselves, give rise to symptoms. Many of my patients referred for hyperacidity have been found, on investigation, to have absent or deficient acid in their gastric juice. The reason for these popular mistakes is the assumption, unsupported by experimental evidence, that the mucous membrane of the stomach is sensitive to changes in the degree of acidity of the gastric juice. The pioneer work of Lennander, Hurst, Ross, Mackenzie, and Carlson has clearly shown that the whole of the alimentary tract, with the exception of the mouth, oesophagus, and anal canal, is insensitive to those stimuli which provoke painful responses in the skin. Heat and cold, acid and alkali, cutting and scratching are all quite painless to a healthy mucous membrane, unless, like the portions mentioned, they are lined with squamous cells. Anyone may satisfy himself of the truth of this contention by swallowing a mouthful of hot tea or ice-cream and noting the presence of oesophageal and the absence of gastric sensation; or if chemical stimulation is preferred a glass of neat brandy will serve as well.

The question whether a diseased mucous membrane may not acquire sensibility to these stimuli is one which is not yet finally solved, although it has been shown that ulcers are not necessarily sensitive to concentrations of acid greater than any that would be found in the stomach under physiological conditions. The conclusion may, however, safely be made that disorders of motility are a more frequent cause of pain than disturbances of secretion. The latter, indeed, appear in many cases to be determined rather by abnormal motor activity than by any unusual behaviour of the secreting glands.

Recognition of the causes of visceral pain explains many curious anomalies of gastro-intestinal disease. We need no longer assume that a painful stomach is the seat of organic disease any more than is the painful colon of colospasm. Disturbances of tone—or of what Sherrington has more aptly termed "posture"—may result from a multitude of extrinsic causes, and our search for these must not be limited to the abdomen. A clearer appreciation of these facts would lead to a lessened use of some well-worn but fallacious abdominal diagnoses.

The application of radiology to gastro-intestinal disease gives rise to another widely held fallacy. It is often supposed that a film or films of the alimentary canal following the ingestion of a barium meal will be sufficient to detect organic lesions or functional disturbances. Actually such films are of relatively little value. Direct visualization of the viscera on the fluorescent screen is essential for accurate radiological diagnosis. Films have their place in confirming what has been seen upon the screen with greater definition or for making a permanent record; by themselves they prove little, and they may often fail to disclose abnormalities which have been clearly seen by the direct method. Screen examination must be left to the expert, and it is better not to attempt gastro-intestinal work in hospitals and institutions where the apparatus and personnel are unequal to the task; otherwise mistakes will be made and much valuable material wasted.

The Rheumatic Diseases

The rheumatic diseases offer numerous examples of fallacies of observation and deduction. May I ask you to bear with me while I make a few observations upon that common and disabling complaint sciatica? The first fallacy is to regard this complaint as a disease instead of as a symptom. Primary neuritis of the sciatic nerve, which is really not a neuritis at all, but a perineural fibrositis, is comparatively rare. Pain referred to the distribution of the sciatic nerve is common enough, but a majority of such cases show no evidence of direct involvement of the nerve or of its fibrous sheath. Tenderness is absent, sensation and power are normal, and the ankle-jerk is unimpaired. The error is important because it determines treatment. It is little use to immobilize the limb in plaster if the cause of the pain is an osteo-arthritis of the lumbo-sacral spine, some affection of the hip or sacro-iliac joint, or, as may rarely be the case, pressure from a pelvic tumour. Carefully selected cases may respond rapidly to manipulation; all require treatment of the primary lesion; few get the complete investigation they deserve.

Incidental to the investigation will be the search for focal sepsis. Shall I be condemned as a heretic if I venture the view that the importance of focal sepsis in the rheumatic and other diseases has been sadly overrated? The frequent presence of gross focal sepsis in the absence of any systemic disease, and the failure to find it, after exhaustive search, in many conditions for whose cause it is held responsible, has long persuaded me that we have been following a false scent. The result has been the wholesale sacrifice of teeth and tonsils, and even of gall-bladders and appendices, with, I believe, subsequent ill-health due to the absence of these organs or to the results of their removal. But here again we must be cautious of allowing our scepticism to run riot. A genuine septic

focus should doubtless be treated—not necessarily by ablation of the organ concerned—but the evidence of its existence must be strong, and our promises as to the remote results of its treatment cautious.

Conclusion

It is not, however, my intention to weary you with a long catalogue of the mistakes which all of us make and which, if sown on fertile ground, are the seeds which grow into the tree of experience and, in the fullness of time, reward us with the fruit of knowledge and wisdom. My purpose in bringing to your notice these few practical illustrations of common fallacies has rather been to point the moral and adorn the tale of the main purpose of my discourse. And this has been to urge that in our attitude to the methods we use in diagnosis and the measures we adopt in treatment we should beware equally of an excess of empiricism as of an exaggerated rationalism. That we should appreciate the value of proven facts and apply to them the highest standard of proof that we can attain. That scepticism is necessary in embracing new ideas, though it is not necessary for us to go so far as Montaigne, who wrote, "I feel we should say most times: There is no such thing." That we must never be impervious to new ideas, and if only we will say "There *may* be no such thing" we shall avoid the pitfalls into which credulity may lead us.

The Hippocratic aphorism which has served me as a text concludes with the observation that judgement is difficult. The late Lord Dewar once remarked that an optimist was one who made of every difficulty an opportunity; and a pessimist one who made of every opportunity a difficulty. Let us then be optimists, and strive to achieve that balanced judgement which alone can enable us to distinguish fact from fallacy and guide us into the path of wisdom.

NON-SPIROCHAETAL INFECTIOUS JAUNDICE

BY

RALPH BATES, F.R.C.S., D.P.M.LOND.

RESIDENT MEDICAL OFFICER, STOKE PARK COLONY

An outbreak of infectious jaundice among the inmates of Stoke Park Colony during 1935 gave an opportunity for the study of this disease. In England the view most commonly accepted is that infectious jaundice occurs in two forms: (1) Weil's disease, a grave form which is spirochaetal in origin; and (2) epidemic catarrhal jaundice, mild in type, of which the causative organism is unknown. The ordinary sporadic form of catarrhal jaundice is regarded as a separate disease, due to an ascending cholangitis, in which exposure to cold and errors of diet play a large part as predisposing causes.

Miller[1] summarizes a more modern viewpoint when he writes:

> "The old view that so-called catarrhal jaundice is due to an ascending infection of the ducts from gastro-duodenitis falls more and more into disfavour. The alternative hypothesis is that it is a hepatitis due to some unknown infection occurring sporadically or in epidemics. Viewed thus it is seen to have an incubation period of fourteen to twenty-eight days, an autumnal seasonal incidence, an age incidence from 5 to 10 years especially, and to have the power of conferring a lasting immunity from fresh attacks. The type of child with 'cyclical vomiting' seems particularly liable to this disease, and adults show much more immunity against it than children."

Hampson,[2] whose work Miller is discussing, points out that "epidemic catarrhal jaundice" is a bad term, and prefers "epidemic infective jaundice."

Hurst and Simpson[3] consider that two separate conditions are commonly diagnosed as catarrhal jaundice. In the first there is gastro-duodenal catarrh with obstruction of the ducts, and the initial symptoms of gastritis are followed by jaundice. In the second there is a mild subacute hepatic necrosis in which jaundice is the first symptom, followed by symptoms of general toxaemia; the liver is tender and slightly enlarged, and the spleen is always palpable. In France catarrhal jaundice is regarded as a manifestation of infectious jaundice. Widal and Abrami[4] state that "infectious jaundice occurs in three forms . . . catarrhal jaundice, benign infectious jaundice, and malignant jaundice."

Weil's disease, or malignant jaundice, is accepted as being due to infection by the spirochaete or *Leptospira icterohaemorrhagiae* of Inada and Ido. The spirochaete may be demonstrated in urine or blood; the disease may be reproduced in guinea-pigs by injection of the same material, or agglutination reactions may give positive results even with dilutions of 1 in 1,000,000.

Some Views on the Causative Organism

The causative organism of "catarrhal" jaundice, sporadic or epidemic, has not been established. These epidemics are regarded by some writers as being due to a mild form of spirochaetal infection. Montford,[5] describing an outbreak in North Leicestershire, refers to two epidemics, among others, in which a spirochaete was found, and states "the symptomatology in these and other British epidemics did not greatly vary, and it would seem that such epidemics are manifestations of the one disease, although a spirochaete or other organism could not be constantly demonstrated." Pettit[6] mentions the many pathogenic spirochaetes which resemble *Spirochaeta icterohaemorrhagiae*, particularly *S. hebdomadis*, *S. pettiti*, *S. pseudo-icterogenes*, etc. He quotes Saesilo, who, working in Amsterdam, found that of nine cultures obtained from rats in the town seven showed typical *Spirochaeta icterohaemorrhagiae*; the other two gave serological reactions identical with those of another spirochaete which causes the spirochaetal fever of Déli. Pettit suggests from this that there may be a second spirochaetal disease in Europe in which the symptoms are less severe than in Weil's disease. This may explain the findings of Elliott and Beattie[7] in the Selkirkshire epidemic, in which eight urines out of ten showed some form of spirochaete and only one a typical leptospira. In no case was animal inoculation successful in this outbreak.

Benign infectious jaundice occurs sometimes in association with infections of the coli-typhoid group. Boyd[8] states "cholangitis may occasionally be a cause of transient jaundice. It is probable that the cases of epidemic catarrhal jaundice are of this nature, possibly due to the paratyphoid group of bacteria." Widal and Abrami mention many investigations into the cause of jaundice in which agglutination reactions, blood culture, or examination of the faeces revealed typhoid, paratyphoid, or *B. coli* infections. They give the following examples:

Sacquépée and Fras,[9] Audibert,[10] and many others obtained positive typhoid agglutinations in cases of jaundice. Netter and Ribadeau-Dumas,[11] Sacquépée and Fras, and Demanche[12] obtained positive paratyphoid agglutinations in similar cases. Typhoid bacilli in the stools of jaundiced patients have been demonstrated by Sacquépée and Fras, and Etienne.[13] Positive blood cultures were obtained in cases of sporadic jaundice by Delachanal and Savy[14] (typhoid), Lemierre[15] (paratyphoid B), Widal, Lemierre, and Bénard[16] (para. *B. coli*). Positive blood cultures of paratyphoid B were obtained in epidemic jaundice by Sarrailhé[17] in the Dardanelles and by Cantacuzène[18] in Rumania. Both obtained strong positive agglutination reactions, and both further confirmed the causative organism. Volunteers were given cultures of the paratyphoid B by the mouth; they were isolated, and all developed jaundice.

On the other hand Martin obtained entirely negative results in the Dardanelles epidemic. Sisto,[19] examining the faeces in 100 cases of jaundice, obtained paratyphoid B in three cases only, and these gave negative agglutination reactions. Garnier and Reilly[20] investigated more than one thousand cases of jaundice; in only 0.5 per cent. did the coli-typhoid group appear to be the cause of the disease. Widal and Abrami describe an interesting case of jaundice in which blood culture showed *Staphylococcus aureus*. At necropsy the condition was proved to be spirochaetal jaundice. They point out, therefore, that the organisms discovered in cases of jaundice may be only "microbes de sortie" thrown out in the course of an unknown infection.

In two of Montford's series of forty-five cases the urine was examined bacteriologically. Both specimens showed large numbers of Gram-negative bacilli resembling *B. coli* in their behaviour, but some of which at least were regarded as *B. proteus*. Poulton[21] describes a case of infectious jaundice which developed epididymo-orchitis as a complication. Investigations for spirochaetes were negative, but the urine contained *B. coli*. It was suggested that both the jaundice and the epididymitis were the result of *B. coli* infection.

In Bashford's[22] series of forty-eight cases the urine and faeces were examined in four cases with negative results, except that in two of them the faeces showed the same serological type of Morgan's bacillus. The sera from six of his cases agglutinated the same type of Morgan's bacillus, but Bashford points out that ten out of twenty normal blood sera give the same agglutination reaction.

Present Investigation

In the Stoke Park series of sixty-five cases specimens of blood, urine, and faeces were sent to Professor Walker Hall of the Department of Preventive Medicine of the University of Bristol. Six blood sera showed no agglutination with an emulsion of *Leptospira icterohaemorrhagiae* in dilutions of 1 in 10 to 1 in 30,000. Eight further specimens of blood were investigated by: (1) culture; (2) examination for spirochaetes; (3) injection into guinea-pigs; and (4) agglutination against typhoid "H" and "O," paratyphoid A and B, *Br. abortus*, and all the Salmonella group. All these investigations gave entirely negative results.

Eight catheter specimens of urine were similarly investigated by: (1) culture; (2) examination for spirochaetes; and (3) injection into guinea-pigs. One specimen gave a culture of *B. coli anaerogenes*; otherwise all the investigations were negative. Four specimens of faeces were examined bacteriologically for typhoid "H" and "O," paratyphoid A and B and others of the Salmonella group, *Br. abortus*, and *B. flexneri* with negative results. There grew out a strain of slow-fermenting *B. coli*, but this on injection into a rat did not cause any untoward symptoms.

Out of the total of sixty-five cases twenty-seven occurred in patients under the age of 10 and forty-seven in patients under the age of 15. Only six patients were over the age of 25, and these were aged 26, 31, 33, 34, 35, and 40 respectively. In addition, two female members of the staff developed jaundice at this time, and are not included in these figures.

Symptoms and Physical Signs

It is perhaps worth while noting the symptoms and physical signs for comparison with other epidemics. In some of the older patients the initial complaints were of sore throat and headache, and the tonsils were enlarged and inflamed. It was noticeable in these patients that the period between the onset of symptoms and the development of jaundice was longer than in the majority of patients. Glover and Wilson[23] describe the occurrence of tonsillitis early in the epidemic. They took swabs from the throats of ten patients, but these showed nothing abnormal. Beauchamp[24] reports three interesting cases of jaundice affecting members of one family. In each case the illness began with a sore throat, followed two days later by the appearance of bile in the urine; two days later still each patient became jaundiced. The incubation period was twenty days.

These and other observations may go to show that a nasopharyngeal infection is at least one means of entry of the causative organism or virus. But in the majority of patients there was no history or evidence of a sore throat. Of the two members of the staff who developed jaundice one complained of severe sore throat with a sudden onset, the other of pelvic pain with an insidious onset. In the older children and adults the commonest initial symptoms were those of "feeling sick," "feeling cold," headache, and abdominal pain. Vomiting was not a prominent symptom. The site of the abdominal pain was over the liver, around the umbilicus, or in the right iliac fossa. Hamilton Fairley,[25] describing the physical signs in his series of cases of Weil's disease, mentions generalized tenderness most marked in the right iliac fossa, and points out that in early cases before jaundice develops a diagnosis of acute appendicitis may be made. In the Stoke Park series the tenderness was generally over the enlarged liver, but three cases showed this tenderness in the right iliac fossa. One patient, the first of the series, had such marked tenderness with a rising pulse rate a week after the appearance of jaundice that he was transferred to a general hospital, where appendicectomy was performed.

Among the younger children a constant feature during the height of the epidemic (when contacts were examined daily) was conjunctival injection occurring as the earliest physical sign. This was noticed at about the same time as the first refusal of food, before the initial rise of temperature, and several days before the appearance of jaundice. It was of value in early diagnosis and segregation.

Kramer,[26] quoted by J. D. Rolleston,[27] describes a group of forty-five cases of Weil's disease in Rotterdam, none of which developed jaundice. In this group the principal symptoms were conjunctival and episcleral injection and pains in the muscles. Pettit states:

"At the beginning of spirochaetosis the principal vessels of the conjunctiva show dilatation; furthermore, small subconjunctival haemorrhages sometimes occur. This congestion is frequent enough to constitute a significant physical sign."

Weekes and Firket, quoted by Pettit, noted this pre-icteric conjunctival hyperaemia in twenty-nine out of fifty patients who later developed spirochaetal jaundice. Morgan and Brown[28] also noted this sign as occurring frequently in the 1925 epidemic of "catarrhal jaundice" described by them.

Pettit also quotes a case of typical "catarrhal" jaundice which proved to be spirochaetal on animal inoculation. In this case thirty-two days elapsed before the guinea-pig (injected with blood) developed jaundice.

Spread by Contact Infection

In recent epidemics most observers support the view of spread by contact infection. Bashford could find no common responsible factor in the epidemic described by him, but points out that person-to-person spread, although the most probable explanation, could only be the result of the most casual contact in his cases. Elliott and Beattie support the same view and quote Hindle and Brown, and Mackie and McLachlan, whose conclusion was the same. Wilson and Glover state that the evidence appears strongly to suggest that transmission was usually by nasopharyngeal droplet infection, and that it was favoured by intimate contact, especially in sleeping quarters. The contrary view is still given in some textbooks; Strümpell and Seyfarth[29] state:

"Fairly extensive epidemics of (catarrhal) jaundice have repeatedly been observed in barracks, prisons, isolated places, etc., and can only be explained on the assumption of a local source of infection. Strümpell once observed a mild epidemic of jaundice in numerous members of a student community, and in this case the beer was to blame."

At Stoke Park the prominent symptoms among the younger children were gastro-intestinal, and it was among these that the epidemic started. A primary alimentary infection cannot be excluded among these children, especially as fifty-five of the sixty-five patients who developed the disease received their food from a common kitchen. But although the first three blocks affected were supplied by the same kitchen, cases did not occur in all three blocks simultaneously, the epidemic ceasing in one block before another became involved. As the epidemic progressed a contact spread became increasingly obvious. Even the early history is suggestive. One boy, "A," developed jaundice in the North Block on December 24th, and another, "B," developed jaundice in Ivy Lodge on December 25th. Both cases were diagnosed as of catarrhal jaundice, and both children were admitted to hospital. The boy "A" returned to the North Block on December 31st. During January there were eighteen cases of jaundice in this block. The boy "B" did not return to his block until January 25th. There were no cases of jaundice in Ivy Lodge in January, the second case developing there twenty-six days after the return of the boy "B." Twelve cases of jaundice subsequently occurred in this block.

At Hanham Hall, five miles from the Colony, a girl developed jaundice following the return of patients from the Colony Hospital. These patients had not suffered from jaundice, and were not nursed in the same ward as cases of jaundice. This first case of jaundice was removed from Hanham Hall at once. Two more patients developed the disease twenty-five and twenty-seven days later respectively. These and other observations give an incubation period (to the appearance of jaundice) in adults and older children of about twenty-six days. Among the very young patients the incubation period appeared to be shorter—from fifteen to twenty-one days. Six cases in the present series showed no jaundice of conjunctiva or skin, although bile was present in the urine and the liver was enlarged. Such patients, if not ill, would act as "carriers," and contact spread could not be traced. This is probably the explanation of isolated instances with an apparent incubation period of forty days or longer. The outbreak in Ivy Lodge following the return of the boy "B" thirty-one days after jaundice suggests that a long isolation period is necessary.

Twenty-eight patients showed no pre-icteric stage, and thirty-one showed a pre-icteric febrile period varying from one to eleven days. Every intermediate day between these figures was represented. Six patients did not develop jaundice. Forty patients showed an initial rise of temperature, which was 103° or over in six cases. The stools were usually paler than normal for twenty-four hours, but typical clay-coloured stools were uncommon. Jaundice was present for more than one week in sixteen cases and for more than two weeks in four. The liver was enlarged in forty-one cases and greatly enlarged (three fingers below the costal margin) in five. The spleen was enlarged in ten cases. Bile was present in the urine in all cases, the longest period being eighteen days. In one case bile was present in the urine for five days, and reappeared for a further two days after being absent for a week. One patient, a boy aged 8½ years, developed two distinct attacks. On the first occasion he was jaundiced for a week. Thirty-four days after bile had disappeared from the urine he developed a more severe attack, which lasted over three weeks. The child had remained during the thirty-four days in a ward with other cases of jaundice. Albumin was present in the urine in eleven cases, the longest period being eight days. Renal casts were not seen.

An Accompanying Acidosis

In the 1925 epidemic in the Midlands, described by Morgan and Brown, vomiting was a constant feature. Its severity and frequence was out of all proportion to the mildness of the attack. The cause of the vomiting was attributed to a duodenitis around the opening of the bile duct. Twenty urines were examined in this epidemic, of which eight gave a positive acetone reaction. Of these twenty urines ten were examined after the tenth day of the disease. Morgan and Brown considered the vomiting to be the cause of the acidosis. One patient in Morgan's series, a girl aged 11 years, died. On section the liver was pale and fatty, and microscopical examination showed that the cells were distended with fat, especially round the periphery of the lobule. Actual necrosis of the liver cells was not observed. Macleod[30] points out that "in cyclical vomiting in man considerable quantities of fat may be present in the liver within a very short period of time after the onset of the condition."

In twenty-six cases at Stoke Park the urine was tested daily for acetone from the onset of the disease, and positive tests were obtained in twenty-four. Only three of these patients had vomited. In twenty cases acetone was present on the first day of the disease in large amount, but this gradually decreased each day until about the fifth or sixth day, when the test was negative. Hampson considered that the disease was particularly likely to attack those children who suffered from "cyclical vomiting," and these findings at first appear to support this view. But five of the patients giving positive results were adults (aged 26, 31, 33, 34, and 40), and another explanation seems necessary in their case. Fever is excluded as a cause of the acidosis, as in eleven out of the twenty cases showing acetone on the first day the temperature was never above normal. Vomiting is excluded, since only three of these patients had vomited. Starvation, even if complete, requires several days to produce acidosis in adults, and a large quantity of acetone bodies in the urine was demonstrated on the first day of the disease. The most likely explanation is that acidosis arises as a consequence of a maladjustment between the metabolisms of fat and carbohydrate, and that this maladjustment is caused by a hepatitis. A similar acidosis occurs in anaesthetic poisoning.

The recognition of this primary acidosis, largely overshadowed as it is by jaundice, is of importance in treatment. Fats need not be prohibited (especially uncooked fats, as in butter and milk) if a sufficiently large carbohydrate intake is assured. In the early stages of the disease large amounts of glucose should be given, in fluid form if necessary, combined with alkalis. If bronchitis is present expectorant mixtures containing ammonium chloride or similar substances are to be avoided. Early treatment by alkalis and glucose appeared to shorten the duration of the jaundice. Signs of acidosis disappeared in twenty-four hours. The alkali dosage should be sufficient to render the urine alkaline quickly. In practice the albuminuria when present was found to disappear rapidly with this treatment.

One patient developed a heavy morbilliform rash, which lasted two days, at the onset of jaundice. Montford describes one similar case and Glover and Wilson describe one resembling German measles, and mention rashes in two or three cases. Morgan and Brown describe one case. Epistaxis was present in five cases, occurring in each instance the day before the appearance of jaundice. One member of the staff also complained of epistaxis the day before jaundice appeared. Some degree of bronchitis was common in the early stages among the younger children.

Nervous symptoms were rare, but one patient developed symptoms better described as "mental." A medium-grade feeble-minded woman, aged 33, became depressed during the first week of an attack of jaundice. This was followed by alternating states of depression and elation, a condition of affairs which lasted three weeks. When elated she was frequently violent to staff and patients. There were fairly well-systematized delusions. Recovery was rapid, and the patient professes to have no memory of her misbehaviour. The case is the more unusual as the patient is well known as a stable defective who gives no trouble.

Two patients who were previously apparently healthy (aged 17 and 11 years) died two and four months respectively after jaundice. In both cases death was due to an acute generalized tuberculosis. The first patient, while still jaundiced, developed an acute generalized bronchitis, which subsequently proved to be tuberculous. The second developed tuberculous adenitis of the neck within three weeks of jaundice.

Summary and Conclusions

Non-spirochaetal infectious jaundice is to be regarded as a general infection in which symptoms of disorganized liver function predominate. These symptoms are due to two main causes: first a maladjustment between the metabolisms of fat and carbohydrate causing acidosis; and secondly an escape of bile into the blood stream causing jaundice, bilirubinuria, a tendency to haemorrhages, etc. Jaundice of skin and conjunctiva is not invariable, and was not present in about 8 per cent. of the present series. Enlargement of the liver is common, occurring in 63 per cent. of cases, and is probably due to a deposit of fat in the liver cells. The spleen was enlarged in 15 per cent. of cases, and 17 per cent. showed albuminuria.

The causative organism or virus is unknown. Guinea-pigs do not appear to be susceptible to the disease. The evidence is in favour of a primary nasopharyngeal infection in some cases. Second attacks are rare, but do occur. The symptomatology differs from that of Weil's disease in degree only. In epidemics, Weil's disease should be excluded as soon as possible.

Every case of "catarrhal" jaundice in children should be isolated for a period of at least four weeks. Any case may be the starting-point of an epidemic. In institutions observation of contacts (particularly with reference to the urine) and quarantine for a similar period should be enforced.

Treatment should be directed principally against the acidosis.

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HUMAN TUBERCULOSIS OF BOVINE ORIGIN IN STAFFORDSHIRE

BY

A. STANLEY GRIFFITH, M.D.VICT., PH.D.CAMB.
MEMBER OF THE SCIENTIFIC STAFF, MEDICAL RESEARCH COUNCIL

AND

J. MENTON, L.R.C.P. and S.I.
BACTERIOLOGIST TO THE COUNTY OF STAFFORD

A recent publication by one of us (A. S. G., 1934)[1] on the incidence in England and Scotland of human and bovine tubercle bacilli in tuberculous meningitis included six cases of this disease from Staffordshire. Of these six cases, three proved to be bovine, two human, and one an anomalous dysgonic strain, which is still under investigation. The bovine ratio in this small series prompted a further and more extended inquiry so as to include all forms of human tuberculosis in this county.

During the period from January, 1934, to June, 1935, we have examined bacteriologically six cases of cervical gland, twenty-nine cases of bone and joint, twelve cases of meningeal, two cases of renal, and 230 cases of pulmonary tuberculosis. The original material—aspirated pus, cerebro-spinal fluid, urine—of the non-pulmonary cases was in each instance injected subcutaneously in the thigh of a guinea-pig at the County Bacteriological Laboratory, Stafford.

Each guinea-pig was killed when its inguinal glands were sufficiently enlarged, and was carefully examined to make sure that there were no lesions other than those which were obviously artificially induced. In none of the animals was there any sign or suspicion of spontaneous tuberculosis, which, in fact, has never been observed among the guinea-pigs in this laboratory. One of the inguinal glands adjacent to the seat of injection was excised with sterile precautions and sent to the Field Laboratories, Cambridge, where the tubercle bacilli were cultivated and typed by one of us. The original material of the pulmonary cases was sputum, and from it cultures were obtained in the laboratory at Stafford, either directly with the aid of KOH (5 per cent.), or through the guinea-pig (three instances).

The results in the different forms of tuberculosis are stated separately.

Non-pulmonary Forms of Tuberculosis

Cervical Gland Tuberculosis.—The six cases were in persons aged 1½, 2, 12, 17, 22, and 23 years respectively, of whom three were males and three females. In the child of 12 cervical adenitis had been present since the age of 4 years, and the culture was obtained from a gland which began to enlarge three months ago. In the three older persons the duration of the adenitis ranged from about one up to three years. The tubercle bacilli obtained in culture from each patient exhibited the characters of dysgonic bacilli of the bovine type and were fully virulent for the rabbit. Six rabbits inoculated subcutaneously with these strains died in from twenty-eight to seventy-one days (average 37.9 days) of general tuberculosis typical of infections with bovine tubercle bacilli.

Bone and Joint Tuberculosis.—The twenty-nine cases comprised fourteen of the hip-joint, nine of the spine, and one each of a finger, a rib, a humerus, a sternum, and a knee- and an ankle-joint. The cultures from nineteen cases were culturally of the human type (eighteen eugonic and one dysgonic). The remaining ten cases—namely, five of the fourteen hip-joints, two of the nine spines, and the finger, rib, and humerus—yielded cultures

which culturally were of the bovine type. The dysgonic strains (nine in number, one case having been examined twice) from eight of the latter group were fully virulent for the rabbit. Nine rabbits were inoculated subcutaneously and three intravenously, and all died of severe general tuberculosis in from twenty-two to eighty-three days. The dysgonic strains from the remaining two cases, both of hip-joint disease, exhibited lower virulence for the rabbit than standard bovine strains. The tubercle bacilli from one of these cases, a girl of 18 who had also suffered from lupus of the neck for two years, were cultivated from sinus pus on two occasions with an interval of two months, once directly and once through the guinea-pig. Each of the strains was tested intravenously on a rabbit in a dose of 0.01 mg. ; one of the rabbits died in fifty-one days of severe general tuberculosis, the other in eighty-eight days of moderate widely disseminated tuberculosis. The two strains were also tested subcutaneously, one on two rabbits, the other on one. The three rabbits died or were killed eighty-seven to 126 days later and showed large caseous adjacent glands and generalized tuberculosis, slight in two and moderate in one ; the kidneys in one rabbit contained projecting nodules and the epiphyseal ends of the femurs of another were extensively caseous. The second case yielding an attenuated strain was in a girl of 11 who had had hip-joint disease for nine years. Three rabbits were inoculated, two intravenously (doses 0.01 and 0.001 mg.) and one subcutaneously (dose 5 mg.) ; they died or were killed in 52, 100, and 100 days respectively and showed generalized tuberculosis, which, however, was of only moderate severity. An indication that the bacilli were not of full virulence was given by the result in the guinea-pig inoculated with the pus from the hip ; this animal showed very limited disease after two months. Such strains of reduced virulence are not infrequently encountered, especially in human skin tuberculosis, although they also occur from time to time in chronic tuberculous affections of bones, joints, lungs, peritoneum, and glands.

Table showing the Age Incidence of the Human and Bovine Types of Tubercle Bacilli in the Bone and Joint Cases

	Number	Human	Bovine
Under 5 years	5	3	2
5 to 9 ,, ...	10	8	2
10 to 15 ,, ...	4	2	2
Over 15 ,, ...	10	6	4*
	29	19	10

*One of these cases was in a farm labourer, aged 62, who pricked his right ring-finger with a thorn some months before tuberculous tenosynovitis supervened. A bulk sample of milk of his employer's herd was positive in September, 1930, and two cows were slaughtered.

Tuberculous Meningitis.—Twelve cases were examined, and the cultures were derived in each instance from cerebro-spinal fluid through the guinea-pig. From seven of the cases the strains exhibited the characters of the eugonic human type of tubercle bacillus. From the remaining five the strains were typically dysgonic bovine culturally and were fully virulent for the rabbit. Six rabbits were inoculated, four intravenously (doses, 0.01 and 0.001 mg.) and two subcutaneously, each with the growth from one primary culture ; they died in 17, 17, 26, 48, 60, and 71 days respectively of typical severe general tuberculosis. For comparison one of the eugonic strains was tested intravenously on a rabbit in a dose of 0.1 mg. of culture ; the rabbit was killed ninety-four days later, and showed only slight tuberculosis of the lungs and kidneys. The following table shows the age incidence of the two types of bacilli in the meningitis cases.

	Number	Human	Bovine
Under 5 years	7	3	4
12 and over	5	4	1*
	12	7	5

* A woman aged 23 years.

Of the patients six were female and six were male. Two females and three males were infected with bovine bacilli.

Renal Tuberculosis.—The two cases of this form of the disease, one in a woman of 29 and one in a man of 25 years, yielded cultures of human type.

Pulmonary Tuberculosis

Specimens of sputum were received from 263 persons suffering from pulmonary tuberculosis in three institutions. As previously stated the sputum was treated with KOH for half an hour at 37° C. and then sown both upon plain egg and upon 5 per cent. glycerin egg. Plain egg was used in every instance because tubercle bacilli of bovine type usually either do not grow or grow scantily on the glycerinated medium. Pure cultures of tubercle bacilli were obtained in 230 of the cases. In thirty-one cases the cultures failed owing to contamination and repeat specimens were unobtainable, either because the patients had died or had left the district. In two cases where the cultures failed owing to contamination repeated examination failed to reveal tubercle bacilli. Of the 230 strains of tubercle bacilli 227 were culturally of eugonic human type, one was dysgonic human, and two were dysgonic bovine.

Strains of eugonic human type were not tested on animals, the classification being based entirely on growth characters on egg and glycerinated potato. The dysgonic human strain, which grew well on egg and with difficulty on glycerinated potato, was tested on a rabbit intravenously and on a guinea-pig subcutaneously, the dose in each instance being 0.1 mg. The rabbit was killed 104 days later and showed only a moderate amount of tuberculosis in the lungs and a few lesions in the kidneys. The guinea-pig was killed, when ill, ninety-two days after inoculation and showed general tuberculosis of mild type.

Particulars of the Two Bovine Cases

Case 1.—Male, 20 years, errand boy, then in engineering works and afterwards occasional outside farm worker ; in sanatorium from October, 1932, to August, 1934. The patient had measles at 11 and quinsy at 13. He had not drunk much raw milk and there was no history of cervical adenitis. On admission the left upper lobe and apex of left lower lobe were infiltrated. Later the signs became rather more extensive on the left side and the right upper lobe was also involved. He died at home from severe haemoptysis in October, 1934, about two years and nine months after the beginning of clinical pulmonary tuberculosis. The parents and five brothers and sisters were healthy, and there was no family history of tuberculosis. A culture obtained directly from the sputum was dysgonic, and, in a dose of 10 mg. subcutaneously, caused severe general tuberculosis in a rabbit, which died in fifty-six days. Only one specimen of sputum was examined, the patient dying before the type of bacillus had been ascertained.

Case 2.—Male, 26 years, miner, admitted to sanatorium in 1926. As a child was rickety, with much deformity of chest. He had pneumonia when 3 years old, and had been ill intermittently ever since childhood. There was no history of glandular tuberculosis. On admission there was advanced disease of both lungs, more on the left side, with much malformation of chest—scoliosis and lordosis—and other

rickety deformities. He is mentally dull. During the years he has been in the sanatorium he has not changed much, but the disease is slowly progressing and the prognosis is unfavourable ; sputum 2 to 3 oz. daily. There is no family history of tuberculosis. For eight years he has drunk half a pint of raw milk daily. Cultures of tubercle bacilli were obtained from the sputum on three occasions, once in August and twice in November, 1934. The three strains were dysgonic (Class 2), and proved highly virulent for the rabbit. Each strain was injected intravenously into a rabbit, the doses ranging from 0.01 mg. to less than 0.001 mg. ; the rabbits died in 21, 34, and 61 days of typical severe general tuberculosis.

Milk Supply

Inquiries were made into the milk supply of all the non-pulmonary bovine cases. In many instances biological tests of bulk samples of the milk from the farms supplying the households had been made prior to our investigations.

These tests were positive in connexion with eleven of the cases, four of which were in adolescents or adults aged 17, 20, 20, and 23 years respectively, and seven were in children whose ages ranged from 18 months to 3¼ years. In one of the latter instances the sample which was positive was taken five to six months before the child, aged 18 months, died of tuberculous meningitis. In another, several bulk samples were positive and six cows were slaughtered during a period of two years before the patient, a boy aged 2½ years, died of tuberculous meningitis. In a further instance, a girl of 2 with cervical adenitis, the milk was positive on several occasions and several cows were slaughtered. Among adults also there appears to have been direct relationship between the milk supply and the tuberculosis. For example, the patient aged 23, a woman who was in the habit of drinking milk in the raw state and who died of bovine tuberculous meningitis, obtained the milk from a supply which had given numerous positive samples. We may mention that for Staffordshire as a whole the percentage of bulk milk samples containing tubercle bacilli during the period in question was 8.48.

Summary

We have determined the types of tubercle bacilli in forty-nine cases of non-pulmonary tuberculosis derived from the county of Stafford. All the cases (six in number) of cervical gland tuberculosis, five of twelve cases of tuberculous meningitis, and ten of twenty-nine cases of bone and joint tuberculosis, yielded cultures of bovine tubercle bacilli. The remainder—namely, seven cases of tuberculous meningitis and nineteen of bone and joint and two of renal tuberculosis—yielded cultures of human tubercle bacilli. These results show that in Staffordshire the percentage frequency of bovine infections in non-pulmonary tuberculosis is somewhat similar to that found in some parts of Scotland. In human pulmonary disease in Staffordshire, on the other hand, the incidence of bovine infections does not at all approach the high percentage of the Scottish figures. In North-East Scotland, comprising the three counties of Aberdeen, Banff, and Moray, the percentage of pulmonary bovine infections in a preliminary series (1935)[2] was 17 as against rather less than 5 for the rest of Scotland, whereas for Staffordshire the percentage of bovine pulmonary infections revealed by this investigation was under 1. Although it is possible that some of the cases from which cultures of tubercle bacilli were not obtained may have been bovine infections, it is unlikely that there could have been so many as would raise the incidence of pulmonary bovine infections in Staffordshire to the level of the Scottish figures. The Staffordshire figures for bovine infections in human lung tuberculosis are more in consonance with the previous figures for England than with the Scottish figures.

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GLYCOSURIA OF "LAG STORAGE" TYPE: AN EXPLANATION

BY

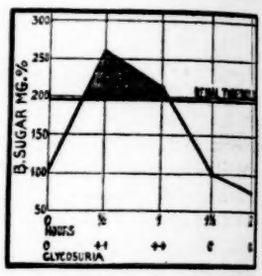
R. D. LAWRENCE, M.D., F.R.C.P.

THE DIABETIC DEPARTMENT, KING'S COLLEGE HOSPITAL

Since the "lag" type of blood sugar curve was first described by MacLean no further attempt has been made to assess or explain it. To judge from the numbers of such curves in my own experience hundreds must have been observed, but the true significance has not been definitely established. Certainly life assurance companies do not accept the condition with the confidence in which they now regard another type of non-diabetic glycosuria—renal, or orthoglycaemic, glycosuria. However, I have observed it so often after gastro-enterostomy and in duodenal ulcer that I have come to the conclusion that it is to be explained entirely by rapid intestinal absorption of sugar, and does not point to any abnormality in carbohydrate metabolism.

The "Lag Storage" Curve

The characteristic features are indicated in the chart, which shows the results obtained a month after gastro-enterostomy in a young woman who was known to be aglycosuric before operation. Before 50 grams glucose by mouth and at half-hourly intervals afterwards, the blood sugar concentrations were 103, 260, 213, 100, 77 mg. per cent. Glycosuria was absent except at the half and the one-hour urinary voiding, when some 2 to 3 per cent. was present. This is a curve typical of the condition. The fasting level is normal ; a rapid hyperglycaemia between 0.2 and 0.3 per cent. occurs at the first half-hour and quickly returns to the normal in one and a half to two hours. In other curves the blood sugar may be higher at one than at half an hour, but, even so, a rapid and complete return to normal in two hours makes the diagnosis conclusive. Temporary glycosuria occurs when the renal threshold is exceeded, and if the renal threshold is low, which I have noted in several cases, glycosuria is persistent throughout the curve.



N.B.—Only arterial blood shows it.

A few other observations should be noted. If venous instead of capillary (arterial) blood be analysed, this type of curve will seldom be noted. This explains the rarity with which the condition has been noticed in America, where, until recently, venous blood has mostly been used in blood sugar curves. The rise in the blood sugar, say from 0.1 to 0.3 per cent. in half an hour, is much quicker than is seen in the typical "diabetic" curve.

If these patients are also tested with 50 grams laevulose, the curves are entirely normal. For example, the patient whose blood sugar is shown in the chart gave the following result: 116, 139, 115, 109, 101 mg. per cent., and excreted a slight trace of laevulose by Selivanoff's test. The absorption of laevulose from the intestine is so much slower than glucose that a flat laevulose curve is to be expected. In one young man, however, the blood sugar rose half an hour after laevulose to 0.172 per cent. (glucose, 0.25 per cent.), but returned rapidly to normal, the latter quite different from either the diabetic or liver deficiency response to laevulose.

If several curves are carried out on these individuals within short intervals considerable variations in hyper-

glycaemia, varying from 0.19 to 0.28 per cent., may be found, but the fasting and two-hour blood sugar is always normal. Such variations must depend on varying rates of absorption or other factors which influence a "normal" blood sugar curve to have similar, though minor, variations. Temporary hyperglycaemia and glycosuria is found in these cases not only after a test meal of glucose, but after any meal containing rapidly soluble carbohydrate. It is shortly after such meals that glycosuria is discovered in some routine test.

In several normal individuals the blood sugar curve after glucose by the *mouth* has been compared with the same quantity of glucose injected by tube directly into the *duodenum*. In every case the latter has approximated to the "lag" type by showing a higher and more rapid hyperglycaemia and a quicker return to normal than after oral administration.

There is no evidence in my experience that patients showing this type of blood sugar curve tend to develop true diabetes. In one case glycosuria and "diabetes" were diagnosed in 1913, and in spite of the patient wisely ignoring all diet restrictions, a typical "lag storage" glycosuria was found on repeated examination fourteen years later. I have seen only one patient out of some eighty develop true diabetes, and this might happen by chance, just as diabetes may occasionally develop in a person with renal glycosuria. Such occasional exceptions only prove the rule in negligible glycosuria of these two types.

The Incidence and Explanation of the "Lag Storage" Curve

This paper has been written because of the frequency with which I have observed the condition after gastro-enterostomy. In several cases it was certain that glycosuria was absent before operation. In others, a quickly emptying stomach associated with duodenal ulcer or a very rapid total intestinal transit has been confirmed. In the majority of these curves, however, no symptoms of intestinal abnormalities have been found and have not been looked for by special methods.

The percentage incidence of this curve in the normal population cannot be assessed, but I am sure it is not infrequent. MacLean found that 19 per cent. of cases investigated for symptomless glycosuria fell into this group, while 48 per cent. showed renal glycosuria, and only 21 per cent. diabetic curves. For various reasons I believe that some 5 to 10 per cent. of normal individuals have a low renal threshold for glucose (renal glycosuria), and I think at least 2 per cent. have a "lag" type of curve. Be that as it may, the assessment and recognition of its true meaning is at least of great importance in assurance work.

The explanation of the "lag" is due, in my opinion, entirely to unusually rapid absorption of sugar from the intestine. The storage mechanism of the liver, the muscles, and the tissues cannot deal with the sugar sufficiently quickly, and a brief hyperglycaemia results. In a short time it is fully dealt with, and the glycosuria and hyperglycaemia disappear.

Nomenclature

The name "lag curve" or "lag storage" curve could hardly be worse or more misleading. The name was probably used to suggest that the storage mechanism, the insulin-glycogen storage mechanism in the most widely current view, was delayed in coming into its action. But the curve is the opposite of slow or lagging. It is brief, quick, sharp, and the name "lancet" or "steeple" has been suggested. For years I have given it in my notes the title of "oxyhyperglycaemia," which has the double merit of good description and good Greek (ὀξύς = sharp, steep). This word falls into line with several others, such as hyperglycaemia, hypoglycaemia, orthoglycaemia, orthoglycaemic glycosuria (renal glycosuria), oxyhyperglycaemia (glycosuria of "lag" type).

Summary

The "lag" or "lag storage" type of blood sugar curve has been so frequently observed after gastro-enterostomy that its occurrence seems to be due to mere rapid intestinal absorption and not to any defect in carbohydrate metabolism.

The nomenclature of the condition could hardly be more misleading, and a new name, oxyhyperglycaemia, is suggested.

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TESTOSTERONE

BY

R. DEANESLY, D.Sc.

AND

A. S. PARKES, Sc.D., F.R.S.

(From the National Institute for Medical Research, London)

It is now well established that male hormone preparations from testis and from male urine are quantitatively different in their biological action. The clearest distinction is that, per capon unit, testis extracts are much more active on castrated rats than are urine extracts.[1] With the isolation of androsterone, the chief male hormone substance of urine, by Butenandt,[2] and its artificial preparation from cholesterol by Ruzicka and his co-workers,[3] a complete examination of its biological properties became possible. It was then obvious that androsterone could not be the main active principle of testis extracts,[4] and Ruzicka and Wettstein[5] suggested that the testis hormone itself might be an unsaturated compound of the same type. In the meantime Laqueur and his co-workers[6] had isolated from testis extracts a crystalline steroid with a high male hormone activity. Oxidation of this gave rise to a diketone, which was identified as one already "synthesized" by Ruzicka and Wettstein,[5] and in a very short time the suggestion of the nature of the testis hormone was shown to be correct. Then, in the course of a month or two, the hormone, called testosterone by Laqueur, was produced artificially from cholesterol by Ruzicka and Wettstein[7] and also by Butenandt and Hanisch,[8] working independently. So ends an amazing chapter in endocrinological chemistry.

The Androsterone and Testosterone Series

Many other compounds of the androsterone-testosterone series have been prepared artificially,[5 9] the majority being more active, but some less active, than androsterone. It is agreed that testosterone is the most active male hormone so far obtained, either naturally or artificially. It is noteworthy that the excreted forms of both the male and the oestrogenic hormones are much less active than the original gonadal forms, while the excreted form of the corpus luteum hormone (pregnandiol) is quite inactive.

According to Laqueur[6] testosterone is seven times more active on capons than androsterone; Butenandt and Hanisch[10] give the ratio as 6 to 1, Tschopp[11] as 8 to 1. In our own experience 16 to 18 gamma of testosterone equals in comb-growth-promoting activity 100 gamma of androsterone (the agreed international unit of male hormone activity). The results correspond very satisfactorily.

Effects on Castrated Animals

It is difficult, if not impossible, to give a definite figure for the activity of testosterone on castrated mammals compared with that of androsterone. Not only are the ratios different for prostate and seminal vesicles, but the slopes of the dose-response curves for the two substances are so different that no ratio is significant unless the level of response at which the comparison is made is also stated. This applies also to other compounds (Parkes).[12] Further, differences in the technique of dissecting and weighing the organs render it difficult even to make the comparison at the same level of response in different laboratories. Tschopp[11] states that testosterone given alone is twenty times as active as androsterone on the seminal vesicles. Butenandt[10] finds a ratio of more than 10 to 1. Our own experiments, carried out on groups of five rats castrated at 40–50 grams and used a month later, ten daily injections being given, are summarized in the table. From these results testosterone seems to be about two and a half to five times as active as androsterone on the prostate, the activity varying with the level of response at which the comparison is made. On the seminal vesicles it is about ten times as active at the level of response at which comparison is possible. Tschopp's[11] results give much higher ratios than these. Testosterone also differs from androsterone in producing a more normal weight relation between prostate and seminal vesicles.[4 13]

As regards its activity per capon unit on rats, testosterone does not, in our experience, come up to expectations. Per capon unit it is little, if at all, more active on the prostate than androsterone, whereas testis extracts, per capon unit, are many times more active. In this connexion Laqueur's[6] statement that the activity of testosterone on rats is greatly enhanced by the simultaneous administration of an *x* substance, itself inactive, from testis tissue, is of the greatest interest. Ruzicka[14] has recently referred to experiments which seem to confirm this statement.

Methyl and Benzoyl Derivatives

The activity of two derivatives of testosterone has also been investigated: methyltestosterone[14] and testosterone benzoate.[15] The former is produced by the introduction of a methyl group in position 17. Similar treatment of the other compounds of the series increases their activity

Substance	Total Dose (mg.)	Weight of		Amount of Androsterone (mg.) required to give similar effect	
		Prostate (mg.)	Seminal Vesicles (mg.)	On the Prostate	On the Seminal Vesicles
Testosterone	0·6	33	10	3·25	6·0
	2·0	61	27	7·0	20·0
	4·0	96	47	10·0	—*
	6·0	136	84	15·0	—*
	8·0	156	99	—*	—*
Methyl-testosterone	2·0	75	32	9·0	20 +
—	Uninjected Controls	16	4	—	—

* Glands of this size not obtained in ten days with androsterone.

on rats considerably and their activity on capons slightly. Methyltestosterone proved to be appreciably more active on rats than testosterone (see table), but duplicate tests on capons showed that the activity was considerably less than that of testosterone—only about one-third. As a result, methyltestosterone, per capon unit, is much more active on rats than is testosterone. This is an anomalous result compared with those obtained on the other compounds, and there seems to be no obvious reason for the difference. The behaviour of the benzoate is also peculiar. Androsterone benzoate has a delayed and prolonged action on the capon comb as compared with androsterone, but the ultimate amount of growth produced by the benzoate is of the same order as that produced by a similar amount of free androsterone. The delay in effect due to benzoylation of androsterone is similar to that produced by benzoylating oestrone, but much more pronounced. Testosterone benzoate, however, even in comparatively "large" doses, has no immediate and little, if any, delayed effect on the capon comb. Thus 1 mg. given over five days to each of a group of five capons produced no detectable enlargement within four weeks. This comparative inactivity of testosterone benzoate is most unfortunate, because the possibility of obtaining a prolonged effect from a short series of injections is of great clinical interest.

We are much indebted to Professor Ruzicka and Messrs. Ciba for supplies of the substances referred to above.

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CHRONIC LEAD POISONING DUE TO THEATRICAL GREASE PAINT

BY

E. L. BARTLEMAN, M.B., CH.B.

AND

CUTHBERT DUKES, M.Sc., M.D., D.P.H.

We report the following case to draw attention to the possibility of acquiring lead poisoning from the use of theatrical grease paint. This origin for lead poisoning has not previously been recorded so far as we have been able to ascertain. In the patient whose history is set out below, a distinguished actress playing the leading part in a London theatre, a very serious illness resulted from the use of grease paint containing large quantities of lead. The consequences of this illness were disastrous to the patient. She became gravely ill, lost her work, narrowly escaped an abdominal operation, and only began to improve after blood transfusion. Step by step evidence was collected to prove that this was a case of lead poisoning, and finally we were able, by a series of chemical analyses, to trace the poison to its source.

We are informed that grease paint similar to that used by our patient has been offered for sale extensively both in London and the provinces. If this continues other cases of lead poisoning similar to this are likely to occur, as well as much vague ill-health of a less clearly defined nature.

History of Case

The patient was an actress aged 28 years. On January 5th, 1936, she consulted one of us (E. L. B.), saying that she had not felt well for the past four weeks, her symptoms being:

1. Tiredness and breathlessness after a little physical or mental strain.
2. Anorexia.
3. Indigestion and flatulence.
4. Menorrhagia.
5. Metrorrhagia.

On account of these uterine symptoms she was taken to see a consulting gynaecologist, who examined her thoroughly but could find no pathological condition in the pelvis. He suggested her symptoms might be due to anaemia, and advised a blood count. The blood count (carried out by C. D. on January 6th) showed the typical blood picture of lead poisoning. The actual figures were: haemoglobin, 70 per cent. ; red blood cells, 3,500,000 per c.mm. ; colour index, 1 ; leucocytes, 8,000 per c.mm. ; differential count—polymorphs, 68 per cent. ; lymphocytes, 28 per cent. ; monocytes, 3 per cent. ; eosinophils, 1 per cent. A great many stippled red cells were seen in stained films, and there was a moderate degree of polychromasia. There was also a slight degree of poikilocytosis and anisocytosis.

Five days later, when the patient was seen again, she complained of:

1. Waking up in the night with acute colicky pains in the lower part of the abdomen, relieved only by firm pressure on the affected part.
2. Frequent vomiting, especially after food.
3. Anorexia.
4. Indigestion and flatulence.
5. Severe neuralgic pains over the left shoulder.
6. Persistent headache.

The patient looked pale, anxious, and anaemic. Her eyes were sunken, and she pressed on her abdomen continually to alleviate her pain. Her temperature was subnormal. The pulse was slow and feeble, but regular in time and force. Her respirations were 20 per minute. The tongue was furred, there was no blue line round the gums, and the teeth were in good condition.

The abdomen was retracted, moving regularly with respiration, and on light palpation was tender all over, especially the lower part. There was no rigidity of the abdominal muscles. There was no tenderness per rectum or any abnormal swelling felt in the lateral fornices.

The central nervous system was normal. Nothing abnormal was noticed in the chest. The blood pressure was 120 systolic and 71 diastolic. The urine contained no albumin or sugar, and the specific gravity was 1020.

A diagnosis of chronic lead poisoning was made on the evidence of the clinical symptoms and blood picture. The patient was advised to leave her house (which was then being painted) and go to a nursing home, where treatment could be undertaken. However, she insisted on playing at the theatre that evening, but after the play was taken to Brighton by her husband.

On January 12th, whilst staying at Brighton, the patient complained again of acute abdominal pain and vomiting, and sent for Dr. Kendall Price, who kindly supplied the following notes. "Patient looked very ill, pale, and anaemic, and in great pain ; temperature 99°, pulse 92, tongue furred, no blue line round gums, teeth good. Chest, nothing abnormal ; abdomen, tender and slightly rigid in the left iliac fossa ; spine normal ; C.N.S., normal ; urine, clear ; no albumin ; no sugar."

On January 13th the pain in the abdomen was worse and very little relief was obtained from morphine. A blood count on January 14th by Dr. Janes revealed: haemoglobin, 68 per cent. ; red blood cells, 3,100,000 ; colour index, 1.1 ; leucocytes, 12,000 ; differential count—polymorphs, 81 per cent. ; lymphocytes, 12 per cent. ; monocytes, 7 per cent. ; polychromasia + ; punctate basophilia + + ; normoblasts numerous. Two days later a specimen of urine was examined, and this showed 0.71 mg. of lead per litre of urine (Roche Lynch method).

The diagnosis was now clearly established, and the course for treatment was plain. Unfortunately, however, the patient did not make any immediate response to iron therapy. In fact further blood counts showed a slight increase in the anaemia.

In view of the fact that the haemopoietic system was not responding to the iron and other treatment the patient was given a blood transfusion of 300 c.cm. of citrated blood from a Group 4 Red Cross donor on February 11th. There was no reaction from the transfusion. Since the transfusion the patient's health has steadily improved, and by the end of February she felt well enough to consider resuming some of her professional engagements.

The anaemia is now disappearing, as shown by the following tests.

February 19th: haemoglobin, 82 per cent. ; red blood cells, 3,840,000 per c.mm. ; colour index, 1.1 ; leucocytes, 9,000. No stippled red cells found. March 3rd: haemoglobin, 93 per cent. ; red blood cells, 4,600,000 per c.mm. ; colour index, 1 ; leucocytes, 9,000 per c.mm. There was no polychromasia, and no stippled red cells were seen.

As soon as we were convinced that this was a case of lead poisoning we began a search for the manner of "infection." We submitted samples of water for analysis with completely negative results. We examined the house into which the patient had been moved, but could find no clue to the source of the illness. We made a careful inquiry into the possibility of contraceptives, but there had been no exposure to "infection" from such a source. Finally, on January 26th, Dr. Price brought to Dr. Janes a sample of grease paint which the patient had been using, and this was found to contain lead. The sample was sent to Messrs. Woodcock and Mellersh, who reported that the grease paint contained 39.27 per cent. of lead, equivalent to lead oxide 42.32 per cent. The lead appeared to be present in the form of lead oxide, chiefly the monoxide.

This completed the story, which may be briefly summarized in the following sentences.

A young actress developed the classical symptoms of lead poisoning. Blood examination revealed anaemia and stippled red cells. The diagnosis was confirmed by the finding of large quantities of lead in the urine and faeces. The source of the lead poisoning was traced to the use of a grease paint containing approximately 40 per cent. of lead.

The Diagnosis of Lead Poisoning

In this case the diagnosis of lead poisoning was suggested first as the result of a consideration of the clinical condition and blood picture. The essential features of the blood picture were anaemia combined with a great increase in stippled red cells. Later very convincing confirmatory evidence was provided by the chemical analysis of urine and faeces, which showed that the patient was excreting large quantities of lead, but the diagnosis was founded on the clinical history and blood tests. We draw attention to this point because in recent years increasing emphasis has been placed upon the estimation of lead in the urine and faeces as specific evidence for the confirmation or exclusion of lead as a factor in suspected cases of lead poisoning.[1] The growing reliance on analytical procedures for the recognition of lead poisoning calls for a clear recognition of the serviceability as well as the limitations of these measures.

Traces of lead may be found in the urine of healthy people. This is due to the fact that small quantities of lead are ingested with such food as sausages, meat, beans, cherries, and other fruit. It appears from the observations of Kehoe and his colleagues that the average American may ingest from one-fifth to one-third of a milligram of lead per diem, and excretes from 0.02 to 0.08 mg. of lead per litre of urine and from 0.03 to 0.1 mg. per gram ash of faeces.[2] Similar figures have been published for other countries. Thus Francis showed that the average rate of excretion of lead for Londoners was 0.049 mg. per litre and for country people 0.023 mg. In Australia also Badham and Taylor found an average lead excretion of 0.02 mg. for healthy people.[3]

This being so it is obviously unsafe to base a diagnosis of lead poisoning on the discovery of lead in the urine

unless this is estimated quantitatively and found to be far above the normal limits. Actually in lead poisoning the patient usually excretes at least 0.1 to 0.3 mg. of lead per litre,[4] and when figures such as this are reached there is strong evidence for lead poisoning. In our patient the quantity of lead excreted was more than ten times the normal, so that the test provided very valuable confirmatory evidence. However, in view of the pitfalls that may beset diagnosis by urine tests, it is important to recollect the paramount importance of the clinical history and blood picture.

The stippled red blood cell is easily recognized in a Leishman-stained film. The affected cells have blue granules, which may be fine and numerous or large and scanty. Whitby and Britton have shown that the stippled cell is really a young red blood cell (reticulocyte), in which the basophilic material has been slightly altered by lead,[5] Anaemia in association with a high stippled red cell count should always suggest lead poisoning. The two conditions in which the blood picture mostly resembles lead poisoning are acholuric jaundice and chronic malaria, in both of which the reticulocyte count is commonly higher than normal. These were each excluded in our patient.

Susceptibility to Lead

It is well known that there is a great variability in susceptibility to lead poisoning. Figures in the pottery industry seem to show that women are about twice as susceptible as men, but this may be due either to the relatively greater dangers in the processes in which women predominate or to their average shorter duration of employment. The records of plumbism show that two-fifths of all reported cases occur during the first eighteen months of employment.[6]

The grease paint used by our patient was the same brand as that used by several other actresses, but so far as we know no other case of lead poisoning occurred. We had the opportunity of examining eleven other members of the cast, and made a special search for stippled red cells in blood films, but these tests were all negative. It is possible that they might have developed symptoms if the use of this grease paint had been continued, but, naturally, this particular brand was not used so freely when it became known that the illness of the chief lady was attributed to this agent. Our tests on other members of the cast were carried out some three or four weeks after this became common knowledge in the company. There was, however, a good deal of ill-health, and there were many complaints of tiredness and headaches among those who had used this grease paint previously.

Composition of Grease Paint

Grease paints consist of various pigments mixed usually with a white base and with fats and waxes. They are sold in many different shades of colour, and should, like lipstick, be "proof against osculation."

The most useful pigments for grease paint are the "earth pigments," which owe their colours to the presence in them of oxide of iron or iron and manganese. The presence of anhydrous ferric oxide colours an earth red, hydrated ferric oxide colours it yellow, whilst oxides of manganese colour it brown. These natural pigments are perfectly harmless, and they alone provide the means for obtaining a number of useful shades. By a judicious mixture with other innocuous materials, such as carmine, alizarin, crimson lake, ultramarine, and lamp black, it is possible to obtain the bulk at any rate of the requisite shades.[7]

The white base is used to provide the necessary opacity for a white paint or to tone down other colours. Zinc oxide alone is often used, or this may be mixed with mineral ingredients which enter into the composition of face powders, such as precipitated chalk, kaolin, and talc.

The function of the fat base is to make the paint sufficiently hard to form a firm crayon. The mixture of fats and waxes must have a melting point above the normal temperature of the blood, and also be sufficiently soft to render the application of the paint easy. The following ingredients are usually employed—vegetable oil and fat such as lard, suet, tallow, etc., animal waxes such as beeswax, spermaceti, and lanolin, mineral oils and waxes such as liquid, hard, and soft paraffin or ceresin.

The paint used by our patient was of a carmine shade, labelled C2. The chemical analysis already quoted found it to contain almost 40 per cent. of lead. This was present in the form of a lead oxide or litharge (PbO). It was at first thought that the lead might be in the form of red lead, but this could not be detected by the peroxide test.

The analytical chemists suggested that the makers of this grease paint had incorporated some ordinary vermilionette containing litharge coloured with eosin. If this were the case the fatty material of the grease paint would be an additional source of danger, as the litharge would tend to combine with the fatty acid forming the lead soap.

We purchased a number of other samples of grease paint from the same source and submitted these to Messrs. Woodcock and Mellersh for analysis. None of these contained so much lead as the original sample, but one contained 9 per cent. of lead, another approximately 6 per cent., and another 1 per cent. Three samples of lipstick and one sample of "grease remover" supplied by the same firm were found to be free from lead. We have not been able to discover any further details of the manufacture of these lead-containing grease paints, but we suspect that the makers purchase the pigments from various sources, and may be unaware that they contain any dangerous constituents.

Incidence of Lead Poisoning

There has been a steady decrease in the incidence of lead poisoning in this country during the last thirty years. The notified cases in 1900 were 1,058; in 1910, 505; in 1920, 289; in 1930, 265. During the year 1934, 198 cases were notified, chiefly amongst workers in painting, pottery, shipbreaking, and smelting of metals.[8] So far as we have been able to ascertain no previous case of lead poisoning due to grease paints has been reported in this country.

Summary

This paper records a serious case of chronic lead poisoning in an actress. The diagnosis was based on the clinical history and typical blood picture. It was confirmed by the finding of large quantities of lead in the urine and faeces. The source of the poisoning was traced to theatrical grease paint, which we find frequently contains large quantities of lead. We anticipate that other serious cases of lead poisoning and much minor ill-health are likely to follow the use of a cosmetic containing such dangerous constituents.

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[6] Memorandum on Industrial Lead Poisoning, H.M. Stationery Office, 1921.
[7] *Pharmaceutical Formulas*, 1934, ii, 124.
[8] Annual Report of Chief Inspector of Factories and Workshops, 1934, Cmd. 4931, p. 5.

Clinical Memoranda

Prominal in Epilepsy

Ten epileptics had a total of 576 grand mal fits during the months of June to November, 1934. During a similar period of time, June to November, 1935, while on prominal, the same group had only 244 grand mal fits, a decrease of 332.

Case	No. of Fits—June to November		Decrease in Number of Fits
	Year 1934	Year 1935 Prominal Therapy	
1	23	8	15
2	41	17	24
3	59	23	36
4	59	34	25
5	83	67	16
6	28	10	18
7	33	9	24
8	7	0	7
9	184	47	137
10	59	29	30

DOSAGE OF PROMINAL

Four patients, Cases 1, 2, 3, and 4, were taking luminal previously to June, 1935. This drug was gradually reduced in dose, prominal being substituted as recommended by Dr. Erich Blum, director of the Mental and Nerve Hospital at Gangelt.[1]

"During the first four or five days one-third of the total luminal dosage is substituted by the equivalent therapeutic dose of prominal; during the next four or five days two-thirds of the total dosage is substituted by prominal; and in ten to twelve days the change-over is complete."

The equivalent therapeutic dose of prominal is 50 per cent. greater than that of luminal. Cases 2, 5, and 6 were taking bromide 20 grains t.d.s. up to May, 1935. Each of the ten patients was having only prominal tablets 3 grains t.d.s. by June 1st of the same year. The dosage five days later was reduced to 3 grains b.i.d., the patients having become drowsy and unsteady. This reduced dose was administered up to November, 1935. Cases 6 and 7, on prominal 3 grains b.i.d., had no fits in four and three months respectively, and Cases 1 and 8, while taking only 3 grains daily, had no fits in five and six months, respectively.

CLINICAL OBSERVATIONS

Prominal is closely allied to luminal, being N-methyl-ethyl-phenyl-malonylurea. It has no observed disadvantages as a drug; drowsiness and an unsteady gait are signs that indicate overdosage. No idiosyncrasy was noticed, no gastric or intestinal upset, and no skin rash. Blood pressure was only reduced when the dose of prominal was being taken beyond the therapeutic dose for epilepsy. Mental excitement and aggressiveness remain unchanged by prominal. It is to be noted that three days elapse before a fit occurs when prominal is discontinued, so that excretion is slow, but a daily dose does not show any cumulative effect. Not only is there the striking reduction in the incidence of fits, but the patients appear bright, cheerful, and more contented. They can now look after themselves, which previously was impossible owing to mental confusion or to being bedded to the extent of requiring a single room with complete care and attention.

L. G. MILLAR PAGE, M.R.C.S., L.R.C.P.
Senior Assistant Medical Officer, Hellesdon Mental Hospital, Norwich.

[1] *Deut. med. Woch.*, 1932, No. 18.

Reviews

THE EARLY DIAGNOSIS OF CANCER

With the object of helping general practitioners to suspect, exclude, and diagnose malignant or premalignant conditions, a book entitled *The Early Diagnosis of Malignant Disease*[1] has been compiled by five members of the staff of the Mount Vernon Hospital, Northwood. The preface and the general introduction have been written by Dr. MALCOLM DONALDSON, who also contributes the chapter on the diagnosis of malignant disease of the female genital organs. His collaborators are Mr. STANFORD CADE, who is responsible for the chapters on the breast, the tongue, mouth and lip, the rectum, the colon, the gall-bladder, bile duct and pancreas, the stomach, the skin, and the bones; Mr. DOUGLAS HARMER, who writes on malignant disease of the upper air passages and the oesophagus; Mr. TUDOR EDWARDS, whose contribution deals with the lungs and mediastinum; and Mr. OGIER WARD, who deals with the urinary system and male genital organs. It will thus be seen that a very strong team has been chosen to discuss this extremely important question. Dr. Donaldson points out in the preface that as in the United Kingdom in the course of a year more than 56,000 people die from cancer, it might be thought that the medical profession had a large experience of this disease. It must be remembered, however, that there were 57,128 qualified men and women in the country to look after these patients, and that therefore each general practitioner saw only a very few patients suffering from malignant disease, a fact which made it very difficult for him to remain efficient in the diagnosis of the disease, especially in its early stages.

The object of this small book is to remind the general practitioner of the essential points in making a provisional diagnosis of cancer, and to urge the necessity of at once sending the patient to some hospital or other institution for expert opinion. Very little mention is made of treatment, as this is quite rightly considered to be outside the scope of the book. Dr. Donaldson recalls to the reader that with modern treatment many of the mutilating operations, such as removal of the upper jaw, are now unnecessary, and even in advanced cases much benefit can be derived by treatment with radium and x rays. In regard to serological and other biochemical tests for malignant disease, these must all, with the exception of the Aschheim-Zondek test for chorion epithelioma, be regarded as still in the experimental stage.

It is hardly necessary to say that the presentation of the facts by the various authors of this book, with due emphasis of important details, has been skilfully carried out. Mr. Stanford Cade, upon whose shoulders is borne so much of the burden, has a happy knack in expressing some of his strongest convictions. For instance, in writing of the breast, he says: "Early diagnosis of mammary cancer should be made with the mind's eye first, with the microscope next, and with the hands, eyes, and nose last, if ever." He holds that it is essential to regard cancer of the breast as a potential diagnosis in all abnormalities of the breast, and that confirmation must be sought by biopsy. He does not believe in the danger of a biopsy—except in the case of bone tumours—and affirms: "There is only one method of diagnosis in the very early case if suspicion of malignancy is entertained—diathermy excision of the tumour and histological verification." In the chapter on the rectum he insists that an adequate examination must be made when the slightest grounds for suspicion exist: "Every student and every practitioner should remember that he was provided with an index

[1] London: H. Milford, Oxford University Press. 1936. (Pp. 168. 8s. 6d. net.)

finger, not with the sole object of prescribing ointment for theoretically diagnosed piles, but that the main function of the medical man's index finger is to explore the rectum of his patient on the slightest provocation."

The authors are to be congratulated upon the excellence of their work and for packing so much vital information into so small a space—there are only 161 pages. This is certainly a book which should be read and pondered by all whose work brings them into daily contact with patients.

BLOOD CELL SEDIMENTATION

The study of blood cell sedimentation has during the last sixteen years come to be an important section of haematology, not only for its intrinsic and widespread interest, but for its usefulness to the laboratory worker and to the physician in the diagnosis and prognosis of many classes of diseases. The medical profession will be grateful to Dr. HANS REICHEL for *Blutkörperchensenkung*,[2] a most excellent exposition of this little-understood and complex subject. After a short historical introduction details are given of the different methods in use for estimating the variations of sedimentation rate, pointing out the precautions to be taken and the sources of error which have hitherto handicapped reliable results and their interpretations.

In discussing the theory of the subject the author deals with the physiological aspect, and gives useful values for normality and the general influences which accelerate or hinder the rate of sedimentation, indicating how in some bloods both positive and negative factors may be present together, so that the true result can be masked. A most useful summary is given of the application of the test to cases of tuberculosis in early diagnosis, during the course of the disease, in prognosis, and as guidance in treatment. Similar analysis is applied to diseases of joints, to cardiac infections, to various inflammatory conditions, to acute fevers, including pneumonia, typhoid, etc. The most attractive chapter is perhaps that which deals with anaemias and blood diseases. The discussion on pages 127 to 130, which considers in detail Stock's formulae, will well repay the reader for its interest and importance.

At the end of most chapters there is a full bibliography, and the book ends with ten pages of authors and a good general index. It is to be hoped that the publishers will see their way to offer us an English edition of this valuable work, certainly essential to the modern clinical pathologist.

THE NEURODERMATOSES

Dr. S. W. BECKER, who contributes a volume on *Commoner Diseases of the Skin*[3] to the series of National Medical Monographs published in New York, is of opinion that the recent advent of the biological era in dermatology has tended to clarify and simplify the study of diseases of the skin. He points out that with the exception of infections and neoplasms skin diseases are confined almost exclusively to human beings, who differ from animals especially in the high development of their nervous systems. We can add that they also differ in the character of their skins. No other mammals have a skin which bears any close resemblance to the human skin. They all are thickly covered with hair, except the members of the pachydermata—for example, the elephant—so in any case the wide difference between human and other mammalian integuments is obvious. This difference is a great obstacle to the advance of scientific dermatology, for the results of experiments on the skin of animals give scarcely any indication of the effects which would be produced by similar measures upon the human skin.

Dr. Becker, however, considers that many heretofore mysterious dermatoses are associated with either hyperactivity or exhaustion of the nervous system. There may be something in what he says, for, after all, the nervous system and the skin are embryologically of the same origin. Dr. Becker considers that patients suffering from the various neurodermatoses such as generalized pruritus, localized pruritus, urticaria, and so forth, are always subjects of nervous exhaustion; and, as a pupil of the late Professor Warthin, he considers that they are victims of "protoplasmic unrest." He also says that such cases are less frequent in Europe than in America, owing to the lack of high-tension work in that exhausted old Continent. Not everybody would agree with him. They are certainly common enough on this side of the Atlantic, and many observers are of opinion that people work as hard and waste less time in Europe than they do in America, though they may not make such a song about it.

Be that as it may, Dr. Becker has made an intensive study of the neurodermatoses, and this forms a feature of the volume. The keynote of his treatment appears to be the cultivation of lazy habits, including a nap after lunch. He also advocates the therapeutic employment of sunlight, both natural and artificial, and he administers the barbiturates for the purpose of reducing nervous hyperactivity. He justifies this temptation to idleness on the ground that such patients are always of an energetic temperament. We shall all agree that in the treatment of the neurodermatoses he will find ample scope for all his therapeutic ingenuity.

Apart from this section Dr. Becker's book is sound but commonplace. It is well illustrated with photographs, and there is a chapter on local treatment, with a number of useful prescriptions. But there is no reason why a British inquirer should prefer it to any of our own satisfactory textbooks on the subject.

SANITARY ENGINEERING

The city of Nineveh had its sewers and ancient Rome its aqueducts, which latter are still a standing memorial to the enterprise of their builders. At the present day we see all around us modern works for water supply and kindred purposes, as impressive as any of bygone years, testifying with no uncertain voice to the competence and energy of the sanitary engineer. In the public health administration of our time he is an outstanding figure, appealing to the popular imagination by virtue of his structures, which are conspicuous, often imposing, and as a rule most obviously effective in serving their object. The enlightened citizen beholding these marvels admires, only partially understands, and feels that he would like to know more of how they came into being. Such further insight into the principles which guide the sanitary engineer may be acquired from a book[4] by Major A. J. MARTIN, which is addressed both to engineers and to members of the lay community who are interested in public health. Of its five main sections that on water supply deals with the sources of water, hydrogeology, and purification. The article on lead in water is up to date, and the chapter on pumps tells of many ways of lifting or speeding water.

Among the other main sections that on sewage disposal is complete and informative without being tedious. A

[2] *Blutkörperchensenkung.* By Dr. Hans Reichel. Vienna: J. Springer. 1936. (Pp. 261; 30 figures. RM. 18; geb., RM. 19.60.)

[3] *Commoner Diseases of the Skin.* By S. William Becker, M.S., M.D. New York: National Medical Book Company Inc. 1935. (Pp. 283; 83 figures. 4 dollars net.)

[4] *The Work of the Sanitary Engineer. A Handbook for Engineers, Students, and Others Concerned with Public Health.* By Arthur J. Martin, Major R.A.M.C.(T.F.) (ret.), M.I.C.E. London: Macdonald and Evans. 1935. (Pp. 472; 78 figures. 16s. net.)

further important chapter is concerned with administration and another with refuse disposal. The concluding section deals with flood prevention, land drainage, and coast protection. The author writes in a lucid style and points his moral, when required, by citing episodes either grim or entertaining, as when, under the former category, he refers to the bursting of the Dale Dyke dam near Sheffield in 1864; and, under the latter, tells the tale of the Chicago drainage canal, by which certain waters of Lake Michigan, intended by nature to flow towards the Gulf of St. Lawrence, have been dispatched to find an unprecedented outlet in the Gulf of Mexico.

TREATMENT OF CHRONIC RHEUMATISM

Dr. JACQUES FORESTIER[5] has written a small book on the treatment of chronic rheumatism, in a series on "new treatments" published from the Pitié under the direction of Professor Rathery. Rheumatic conditions are divided into arthritis (rheumatoid types); arthroses (osteo-arthritic types); and algies (non-articular rheumatism). The ordinary treatments are described for these conditions, but the real interest of the book centres on the discussion of gold salt therapy, of which Dr. Forestier is a well-known exponent.

Whatever form of treatment is chosen rapid results must not be expected, and this is also true of gold therapy, since success is only to be looked for after two or three months' courses separated by seven or eight weeks. Gold salts are not useful in the osteo-arthritic types, but according to the author they are of value in almost all stages of the rheumatoid type, especially in the subacute-becoming-chronic stage. In really chronic cases, however, promising results are sometimes obtained. The first few doses should be small, to ensure that the patient is not unduly susceptible. The uses of various preparations are considered, but the author prefers solganal B. The criterion of cure should not be purely clinical, but should include a return to normal of the blood picture, and especially of the sedimentation test. Every aspect of the treatment is discussed, including the results of tests of the susceptibility of the patient, and illustrative cases are quoted at length.

All those who wish to undertake the treatment of their rheumatic cases with gold salts will do well to study this little volume.

COLLEGIATE HEALTH

It is scarcely open to question that the educated man or woman ought to possess some knowledge of the laws of health as affecting the individual and some acquaintance with the procedure by which these laws may be applied by Governments for the well-being of the nations. Adequate instruction in such matters is perhaps specially appropriate in the case of students, who while at college are under the stress of competitive mental or physical effort, and who in after life, when engaged in professions or in public administration, may become themselves responsible for the health of others. For these and kindred reasons the ruling bodies of a number of American colleges have deemed it wise to cause to be conveyed to the generality of their undergraduates—that is to say, not to students of medicine only—more explicit guidance on healthy living than is usual in this country.

In a work[6] now in its fourth edition Professor C. E. TURNER of the Massachusetts Institute of Technology presents this health instruction to students in a compendious and most readable form. His topics range from physiology and heredity, including *Drosophila* and the X-chromosome, to disease prevention, water supply, ventilation, industrial hygiene, and maternal welfare. The author enunciates sound principles and offers good advice, relieving the latter at suitable intervals with vivid or lighter touches. By citing the tragic deaths from cholera of "Mrs. E." and her niece in 1854, he brings home to the mind the lethal character of the Broad Street well. In another passage he seeks to curb too soaring ambition in his youthful readers by pointing out that the "little red schoolhouse" cannot give to every boy an equal chance of becoming President of the United States.

PHYSICAL DIAGNOSIS

Martini's Physical Diagnosis has been translated from the German, and appears under the editorship of Dr. ROBERT F. LOEB of New York.[7] The author was a pupil of Friedrich von Müller of Munich, to whom he pays due respect, and that in itself vouches for the matter of the book. Physical diagnosis refers to the results obtained from direct examination of the patient, as carried out through the application of the various senses. The methods of physical examination by observation and touch, and simple means such as the stethoscope, are set out here with accuracy, and the conclusions to be drawn in diseases of the respiratory tract and circulatory system are indicated. Each section is followed by a useful synopsis of the diseases of the system under observation, which in a rather diagrammatic summary correlates the discussion of signs observed with the physical findings as they usually appear in various disease states. A shorter section gives a résumé of the physical examination of the abdomen. Examination of limbs, joints, and the nervous system is not mentioned, and this is an omission which detracts seriously from the usefulness of the book. In a concluding chapter the essentials of a good history are given in outline. The book is clearly written, and descriptions of physical signs and their physiological basis are described in detail. In former days a small manual by Dr. Jex-Blake covered the same ground. The present volume may be regarded as an up-to-date description of the same subjects.

In a small handbook on Phonoscopy[8] Dr. ODOBLEJA of Bucarest describes the principles of the method of delimiting solid and hollow organs by listening with a stethoscope while coin or finger percussion is made in the vicinity. The author makes considerable claims for the value of the method, and applies it to the examination of the liver, heart, lungs, and abdominal organs.

CHILD PSYCHOLOGY

Those who study in detail the psychological problems of childhood have long realized the great value of the work of Professor CHARLOTTE BÜHLER, and an English translation of a small book entitled *From Birth to Maturity*[9] presents in simple form the results of research in Vienna on the development of the normal average child. The book began originally as a series of lectures to students and teachers, but it has grown considerably in the process of editing, and has completely lost the

[5] *Le Traitement des Rhumatismes Chroniques.* By Dr. Jacques Forestier. Paris: J. B. Baillière et Fils. 1934. (Pp. 99. 12 fr.)

[6] *Personal and Community Health.* By Clair Elsmere Turner, M.A., D.P.H. Fourth edition. London: H. Kimpton. 1935. (Pp. 680; 131 figures, 4 coloured plates. 12s. 6d. net.)

[7] *Martini's Principles and Practice of Physical Diagnosis.* Edited by Robert F. Loeb, M.D., from the authorized translation by George J. Farber, M.D. Philadelphia and London: J. B. Lippincott Company. 1935. (Pp. 213; 30 figures. 9s. net.)

[8] *La Phonoscopie. Nouvelle Méthode d'Exploration Clinique.* By Dr. St. Odobleja. Paris: G. Doin et Cie. 1935. (Pp. 202; 29 figures. 30 fr.)

[9] *From Birth to Maturity. An Outline of the Psychological Development of the Child.* By Professor Charlotte Bühler, Ph.D. London: Kegan Paul and Co. Ltd. 1935. (Pp. 237; 15 figures. 7s. 6d. net.)

somewhat stale stamp too often characteristic of the reproduced lecture. Indeed, it is a freshness of outlook and enthusiasm which is the main feature of a book full of interest for paediatricians, teachers, and intelligent parents. A final chapter on the influence of heredity on the psychological development of the child states, without solving, many interesting problems for future work. An appendix summarizes briefly the methods of investigation employed. These can be studied in more detail in another volume called *Testing Children's Development from Birth to School Age*,[10] in which Professor BÜHLER has been assisted by Professor HILDEGARDE HETZER, the book being a translation from the 1932 German edition by Professor Henry Beaumont of Kentucky. The purpose of the book is to indicate, especially for younger children in the pre-school age, how the older intelligence tests fall short, and to suggest other procedures which will give a fuller indication of the child's total psychological development, and particularly its behaviour in test situations. Great ingenuity is to be found in the methods evolved by the Viennese workers for the tests in the early months of life.

Notes on Books

Dr. I. MATSUO and his co-workers in the department of medicine of Kyoto University have devoted themselves for many years to the study of the distribution of dyes in the body. Their papers, which have appeared in a wide variety of journals, have been collected and published in two large volumes.[11] The first volume appeared last year and the second has just reached us. The two together contain reprints of about one hundred papers that have appeared during the last decade. They deal chiefly with the adsorption, excretion, and distribution of dyes in the body. There are also papers on the pharmacological actions of dyes. This massive piece of systematic work should prove of great value to future investigators in a wide field of medical science.

A small volume, *Bioklimatik*, edited by Dr. A. GÉRONNE (Munich, J. F. Bergmann) contains the proceedings of the recent conference on bioclimatology, held at Wiesbaden and convened by three German medical societies—those of internal medicine, of balneology and climatology, and the society for combating rheumatism. The discussion of climate in relation to health has a philosophical as well as a medical interest. Thus Dr. Schittenhelm of Munich emphasized the diurnal and seasonal rhythms observable in plant and animal life, as shown in the variations of blood calcium and iodine and of the alveolar tension of carbonic acid gas. Disturbances of rhythmical response and difficulties of readjustment were important factors in many forms of disease. Professor Linke of Frankfurt sought to analyse these modifying influences in climate. The modern study of bioclimatology had taught many lessons—the complexity of the equation, the value of *combinations* of meteorological elements, the gross fallacies that arose from reliance on averages, which concealed the facts. A diurnal variation might cover 35 degrees of temperature as well as wide ranges of light and humidity, which normally produced a physiological response. The medical man also had to study the *un*periodical changes of weather, which seriously tested the power of adaptation of a "surprised organism." Many other contributions of practical interest are contained in these proceedings, such as the paper by Dr. Pfleiderer of Kiel on the meteorophysiology of heat regulation, with studies of the climates of altitude, of "middle heights," and of the sea coast, supported by research data from the bioclimatic institutes of Germany.

[10] *Testing Children's Development from Birth to School Age.* By Professor Charlotte Bühler, Ph.D., and Professor Hildegarde Hetzer, Ph.D. Translated from the first German edition (1932) by Professor Henry Beaumont, Ph.D. London: G. Allen and Unwin Ltd. 1935. (Pp. 191; 48 figures. 12s. 6d. net.)

[11] *Biologische Untersuchungen über Farbstoffe.* By Dr. Iwao Matsuo. Vols. i and ii.

THE LONDON AMBULANCE SERVICE

On April 1st, 1930, the Local Government Act, 1929, came into operation, which transferred to the London County Council the powers of the late Metropolitan Asylums Board and twenty-one boards of guardians, and, with these powers, the ambulance services formerly maintained by these authorities.

As long ago as 1909 the Council had itself obtained powers to establish an ambulance service, mainly to deal with street accidents. Some time elapsed before these powers were exercised, and the London Ambulance Service came into being in 1915, with a fleet of eight motor ambulances, six ambulance stations—temporary buildings constructed of corrugated iron—and a staff of about fifty drivers and ambulance attendants. Two of these temporary buildings are still in existence, but they will be replaced during the coming year by two modern brick-built buildings, one at Lee and one at Shoreditch, each capable of accommodating three or more ambulances.

Progress Since 1915

By 1930 the Council's service had fourteen stations, twenty-one ambulances, and a total staff of nearly 200 persons, while that of the late Metropolitan Asylums Board had 107 ambulances, six large ambulance stations, each with a capacity for housing some twenty-five vehicles, and a staff of 270. The various small ambulance services maintained by the late boards of guardians to serve their hospitals, or "infirmaries" as they were then called, were also swept into the net, and one comprehensive service was inaugurated to deal with the needs of the 117 square miles which the Council administers.

The first step was to establish a system of central control for the united service. Such a system had already been adopted by the Council for its original service and also to some extent by the Metropolitan Asylums Board. The administration of the two larger services was first of all centralized, and at a later date the smaller guardians' services were gradually absorbed. While the reorganization was being carried out the work of the Ambulance Service continued, and the changes were effected without causing any disturbance to the daily round.

The Central Switchboard

A centre with a large telephone switchboard was provided—a miniature exchange through which every call for an ambulance passes—and this is now installed at the head quarters of the London Ambulance Service, on the sixth floor of County Hall.

This switchboard, which is maintained by the London Telephone Service, is provided with twenty in-coming lines, on any one of which calls may be received, and two other lines for service purposes. There are now twenty-two ambulance stations, and each is connected by a private line with the central switchboard, so that the officers who manipulate the switchboard can communicate directly with any ambulance station without calling upon the telephone exchanges. The exchanges can be used in emergency, however, as every station is equipped with an independent telephone instrument with an exchange number. As a further precaution there is an emergency switchboard in the basement of County Hall which can be placed into immediate operation in the event of a breakdown.

The switchboard is divided into two parts. One side deals with applications for removals of patients to hospitals, which are so numerous—over 1,000 cases have been received in one day—that the calls are relayed to another room, where there is a staff of ambulance clerks whose duty it is, on receiving an application, to make arrangements for a bed for the patient and for the dispatch of the ambulance. In normal circumstances the removal is effected within an hour. A system of coloured electric lights—red, to indicate when an emergency ambulance at a particular station is out, and green, to show when the ambulance arrives at the hospital—is installed in the switchboard room and duplicated in the room occupied by the ambulance clerks.

On the other side of the switchboard are received calls for accidents of any kind, including street accidents, and for the removal to hospital of maternity and other urgent cases; in fact all calls for cases of emergency in which the immediate dispatch of an ambulance may be a matter of vital importance. In these cases the procedure is as follows. A caller, sometimes a police officer, rings up. He asks for an ambulance to come to a street accident and gives the locality. That is all the information required. A plug is inserted and the ambulance station nearest to the scene of the accident is immediately in communication. The information is passed, and the officer who receives the message at the ambulance station calls "Turn out," and the ambulance immediately leaves the station. One minute is the time allowed for receiving the message, passing it to the station, and turning out. The time of a good "turn out" does not exceed fifteen seconds, and the average time taken by an ambulance to reach the scene of an accident or any sudden emergency, from the reception of the call at headquarters, is six and a half minutes. Nearly 48,000 cases were dealt with in this way in 1935.

Staff and Material

The total active strength of the London Ambulance Service, which now has a staff of 464, excluding ambulance nurses, is 153 ambulances, but a reserve of twenty older vehicles is always maintained, so that the number may be augmented in times of pressure. There are also twenty ambulance omnibuses, each constructed to carry from eighteen to twenty patients. These are used principally for the conveyance of convalescent patients, many of whom are children, to convalescent homes at the seaside or in the country. The ambulance omnibus can, however, be converted in a very few minutes into an ambulance capable of carrying six adult stretcher cases, so that in the event of a serious epidemic occurring, when it might become necessary to convey patients in considerable numbers to the L.C.C. "river" hospitals, near Dartford, they could be made immediately available.

The six larger stations, at each of which about twenty-five vehicles are accommodated, are each under the control of a superintendent, while ambulance station officers are in charge of the smaller stations used for the emergency service, each accommodating two ambulances. Normally eighteen ambulances are available for emergencies during the daytime and twelve at night, between 11.30 p.m. and 7.30 a.m. There are, however, thirty-two ambulances fully equipped and available for immediate service in times of stress. On the occasion of the Silver Jubilee of King George V the full strength of the emergency service was made available for street service: 240 calls were received, and not a single delay in "turning out" was recorded. The ambulances used for the emergency service bear a special sign, "Accident Ambulance," over the driver's cabin, coloured blue, and illuminated at night. The ambulances are equipped to deal with all kinds of accidents—stretchers with spare poles and canvases, blankets, splints, and bandages, drugs and surgical instruments for use by a doctor, and oxygen apparatus for reviving persons who may be gassed or partially drowned, all form part of the equipment. The patients are laid upon a rubber or air bed, which is supported in the ambulance by a spring mattress, and four recumbent cases can be carried if need arises.

To give some idea of the magnitude of the work of the service it may be mentioned that in one year over 360,000 persons were carried in the Council's ambulances, and that the total mileage recorded was over 2,000,000 miles. The ambulance drivers and attendants number 398.

Range of Service

Ambulances are provided without charge for the removal of:

(*a*) All cases of accident.
(*b*) Cases of sudden illness occurring in the streets.
(*c*) Cases of "life or death" occurring in private houses on the application of a doctor.
(*d*) Maternity cases.
(*e*) Cases of infectious diseases.
(*f*) Removals to the Council's hospitals of non-infectious illness. (Subject to assessment based upon the patient's ability to pay a charge.)

Ambulances can also be hired. The charge for conveyance between any two addresses within the County of London is 12s. 6d. Until April 1st, 1935, ambulances were available for the removal of maternity patients to hospitals only between the hours of 11.30 p.m. and 7.30 a.m., but these facilities have now been extended, and apply throughout the twenty-four hours.

How can an ambulance be obtained? In the case of street accidents delays often occur because no one calls the ambulance. Sometimes a person who witnesses an accident waits until a police officer arrives. In the City of London, which maintains its own organization, it is only necessary to find a police officer. Elsewhere in the County of London all that it is necessary to do is to go to the nearest telephone and ask for "Ambulance." No telephone number is required, and if the call is made from a public call office no charge is made.

Arrangements for the removal of patients to the L.C.C.'s hospitals are usually made by the patient's own doctor through the medical superintendent of the hospital at which the patient will be admitted, but, in case of need, application may always be made to the local public assistance officer.

INTERNATIONAL CANCER CONGRESS, BRUSSELS, SEPTEMBER, 1936

The second International Congress of the Scientific and Social Campaign against Cancer will be held in Brussels from September 20th to 26th, 1936. The Congress is under the patronage of the King of the Belgians and Queen Elizabeth, and it has the support of the Government. The National Executive Committee consists of Dr. Lerat (chairman), president of the Belgian National League against Cancer, Professors Delrez, Dustin, Goormaghtigh, and Maisin, directors of the anti-cancer centres of Liége, Brussels, Ghent, and Louvain respectively; Dr. Sluys, president of the Belgian Society for Radiology; Dr. Timbal, Director-General of the Government Department of Hygiene; M. Marchal (treasurer), and M. W. Schraenen, general secretary of the Belgian National League against Cancer and of the Congress.

The programme of the Congress has been divided into two main groups, embracing the scientific campaign and the social campaign against cancer, and the subjects on which official reports will be prepared and upon which individual communications are invited are grouped together under the following headings:

1. The experimental investigation of cancer, which comprises the study of carcinogenic substances, transmissible agents and viruses, growth substances, and factors of predisposition and resistance such as heredity, metabolism, and immunity.
2. The diagnosis of cancer by histological, radiological, and serological methods.
3. The treatment of cancer by surgical, medical, and radiological methods.

In the second group, on the social campaign against cancer, the subjects dealt with are:

1. Access of patients to diagnosis and treatment.
2. Medico-social assistance to incurable cases.
3. Cancer and demography, including statistics and racial incidence.

The list of official "rapporteurs" is not yet complete, but among those who have agreed to present reports are: M. Borst, J. W. Cook, W. Cramer, H. F. Deelman, L. Dublin, A. P. Dustin, J. Ewing, W. E. Gye, H. Holthusen, E. L. Kennaway, J. Maisin, M. Nagayo, F. Pentimalli, Cl. Regaud, P. del Rio Hortega, G. Roussy, C. Rowntree, H. Schinz, and F. Carter Wood.

Any further particulars may be obtained from M. W. Schraenen, general secretary to the Congress, 13, Rue de la Presse, Brussels, Belgium.

British Medical Journal

SATURDAY, MARCH 14th, 1936

THE MEDICAL RESEARCH COUNCIL'S REPORT

In reviewing in these columns the latest annual report of the Medical Research Council[1] we would urge those readers who have not previously read these volumes to make a start now. "Report" (except in its subsidiary meaning) is a dull word; it suggests something rather ponderous and official, one of those things that have to be done and, having been done, may be left well alone. Titles such as "Men against Death" and "The Conquest of Suffering" have a clarion sound that awakens even the most sluggish. They have the power of the effective slogan. We would not for a moment suggest that the Medical Research Council should wander from its decorous path and engage a Fleet Street sub-editor to think out snappy titles. Good wine needs no bush. Our wish is to persuade the busy practising doctor that in plain and readable language the Medical Research Council tells an annual tale that is as exciting as any thriller.

Not only does the report for 1934–5 give an account of the advances made in medical science, but it offers the medical man guidance on how these advances may be applied. For example, it states that doctors using the oestrus-producing hormones—"oestrone," "oestriol," and "oestradiol"—"progesterone," and "androsterone" should insist upon knowing the exact nature and strength of the preparations supplied, for "a uniform scientific nomenclature and standard units have been adopted for [these] three important natural substances." Clinical knowledge of the actions of these hormones is still meagre; there has been a tendency on the part of doctors to prescribe them indiscriminately; and while some of the "proprietary preparations are good, both their composition and activity being controlled, others are of a semi-bogus nature." Now that the practitioner of medicine has access to such potent physiological substances of known constitution and activity, a field of clinical research is open to him in which a careful selection of cases and a critical assessment of results should lead to further control over those deviations from the physiological mean that we term disease.

It must not be supposed, however, that the worker in the clinical field always has to wait for the accurate measurements of the physiologist and biochemist before his contribution to medicine can be made. A remedy for scurvy was discovered long before the word vitamin appeared in the medical dictionary, and longer still before the discovery of ascorbic acid. In the writings of Hippocrates "as big an ox-liver as possible, raw, and dipped in honey" was recommended for the treatment of night-blindness.[2] We now prescribe vitamin A. Another interesting example of the scientific vindication of clinical acumen is the isolation of ergometrine by the late Dr. H. W. Dudley and Dr. Chassar Moir, to which the report refers at some length. Between 1906 and 1933 a number of active alkaloids, chemically distinguishable from ergotoxine but practically identical with it in pharmacological action, were obtained from ergot. Ergotoxine was found to have a strong stimulant action on the plain muscle of the arteries and the uterus, but neither this nor the other alkaloids isolated produced their effects at all readily when given by the mouth. To increase the confusion, it was found that these alkaloids were absent from the watery extracts of ergot which the clinician was giving to his patients. "The apparent disparity between pharmacological evidence and clinical practice remained, and a certain scepticism arose as to the basis of the clinical reputation of these watery ergot extracts," a scepticism which received its first blow when Chassar Moir published in the *British Medical Journal*[3,4] an account of his method for obtaining a quantitative record of the contractions of the human uterus in the puerperium. The *coup de grâce* came with the isolation of ergometrine: in our issue of March 16th, 1935 (p. 523), Dudley and Moir wrote: "It seems clear that ergometrine should now be regarded as the most important active principle in any ergot preparation intended for oral administration, and the problem of the preparation of suitable extracts will have to be re-examined in the light of the knowledge now available."

Although in this case the research worker has only—if we look at the matter from a practical point of view—confirmed by patient inquiry something that was already known to the clinician, he has nevertheless now provided the latter with a drug that can be given in a pure form and in accurate measure. Much, indeed, of the recent investigations referred to in the Council's report has had to do with this question of measurement, of refinement of technique, of the reduction of the problems of disease to chemical terms. An interesting account is given of Dr. H. D. Dakin's and Dr. West's method of preparing the active haemopoietic agent from liver in a much purer state than has hitherto been possible: the substance produced is highly potent, but upon what chemical or physical property of the liver principle the therapeutic effect depends is still a mystery. Statistical analysis of figures given by the Registrar-General shows that there has been a big fall in the death rate from pernicious anaemia up to the age of 65, with, as might be expected, a rise after this age. A more reliable

[1] Report of the Medical Research Council for the Year 1934–1935. Cmd. 5079. H.M. Stationery Office. 1936. (3s. net.)

[2] *Vitamins and other Dietary Essentials.* By W. R. Aykroyd. Heinemann.

[3] *British Medical Journal*, 1932, i, 1022.

[4] Ibid., p. 1119.

method for determining small quantities of iodine in biological substances is the outcome of a special inquiry into this problem initiated by the Medical Research Council, and further and more accurate knowledge on the relation between iodine and disease of the thyroid may now be expected. Chemistry, too, is training its guns on the "organizer" which, as Speman showed, can when introduced into abnormal situations in another amphibian egg induce the formation of a second embryo. It was found in the Strangeways Laboratories that this was also true of warm-blooded vertebrates. The organizer is probably related to the oestrogenic compounds. Also arising out of the work begun at Cambridge by the late Dr. Strangeways are important investigations on experimental radiology by Dr. F. G. Spear and his co-workers on fowl embryos *in ovo*. It has been found that recovery from the effects of irradiation on such sensitive processes as cell division can take place so long as the circulation remains intact. If the dose of *x* rays or of the gamma rays of radium is high enough to destroy the circulation the degenerative effects of irradiation are increased.

Space does not allow of more than a brief mention of some of the work carried out under the guidance of the Council or with its encouragement, including such diverse subjects as bed-bug infestation, the toxicity of industrial solvents, anaesthetics, the prevention of puerperal fever; but some reference may be made to the survey, in the introduction to the report, of the problem of nutrition. The Council, while it welcomes the awakening of the public to the importance of proper feeding, states that at present only a small fraction of the people have reaped the benefits of modern knowledge on nutrition. In this country the report of the Nutrition Committee of the British Medical Association played a big part in rousing professional and public interest, and the wide sale of the Cookery Booklet based on that report shows that this interest is not ephemeral.

Towards the end of the introduction to the volume issued this week the Medical Research Council has to record that, as a result of a change in the policy of the Rockefeller Foundation of New York, the Travelling Fellowships in Medicine will no longer be awarded in this country. The Foundation has abandoned its present system of international fellowships "in favour of concentration upon a more restricted programme for the promotion of research." The scheme that has been abandoned is, however, looked upon by both the Council and the Foundation as having been highly successful, and it is hoped that other benefactors will follow the generous example of the trustees of the late Viscount Leverhulme in enabling the Council to fill "the gap in the national system of higher medical education which will be caused next year by the withdrawal of the provision for travelling fellowships which has hitherto been made through them by the Rockefeller Foundation."

MEDICAL CORONERS

There is, we believe, a general feeling that the report of the Departmental Committee on Coroners[1] is unnecessarily severe on medical coroners. The public criticisms directed against coroners generally, or the particular complaints which initiated the setting up of this committee, were not, in the Press or elsewhere, directed collectively or individually against medical coroners; nor is it alleged either in the report or elsewhere that the medical coroner, as such, is less efficient than his brother coroner. The report says: "We do not desire to detract in any way from the valuable work which has been, and is being, done by medical coroners."

By the Coroners' Amendment Act, 1926, a coroner must be a "barrister, solicitor, or registered medical practitioner, of not less than five years' standing in his profession." Before that date no professional qualifications either in law or in medicine were required. What has happened during the last nine years to justify the finding of the committee that "the office should in future be confined to solicitors or barristers"? The report barely touches upon the evidence that led the committee to this conclusion. The representatives of the medical profession were never challenged to defend the medical coroner as such, or the coroner with both legal and medical qualifications, of whom there are a considerable number occupying as whole-time officers the most important positions in the country—in London, Birmingham, Liverpool, and elsewhere. Nor were our representatives or medical coroners themselves afforded an opportunity of replying to hostile evidence, if such was presented to the committee. It cannot be seriously contended that the possession of medical qualifications renders the holder less suitable to fulfil the duties seeing that an inquest is held primarily to determine the cause of death. Indeed, the committee makes no such suggestion. What it says is: "We consider that legal training is of greater importance than medical training in this matter." The medical man who has been called to the Bar would not be ruled out if the office of coroner were restricted in future to members of the legal profession, but a practising barrister or solicitor might well be preferred to him by any appointing authority that shared the committee's view.

The recommendations envisage the reduction of the coroner's legal powers. He is no longer to have the power to commit any person for trial on the inquisition on a charge of murder, manslaughter, or infanticide; and his inquiry is to be limited to an investigation of the facts, how, when, and where the death occurred, the investigation being clearly distinguished from any trial of liability, whether civil or criminal. There is therefore to be a simplification of the procedure and a diminution of the judicial

[1] *British Medical Journal*, February 15th, 1936, pp. 318, 322.

element, while in several other directions the medical aspect of the work is relatively enhanced. No small proportion of the coroner's work at present is concerned with deaths referred to him either by a medical practitioner or by the registrar of deaths, and he takes the full responsibility for the contents of the certificate of causes of death where no inquest is held. He is required to hold an inquest on the victims of all industrial diseases, and to exercise a discretion as to when an inquest is to be held in a death occurring under an anaesthetic. He must be capable of comprehending pathological phenomena and of scrutinizing a pathological report. There are many other aspects of the work calling for a knowledge of medical matters which would be difficult for a lawyer to acquire. The Departmental Committee has been compelled to recognize this, and proposes to meet it in the following manner: "We also recommend that a coroner should have training in forensic medicine. If the Medico-Legal Institute, referred to above, is established it might well be authorized to give a course in forensic medicine for persons who desire to become coroners." Only those who have spent five or six years in the study of medicine can fully appreciate the insufficiency of this proposal. It will be difficult to convince the trade unions, employers' associations, and insurance companies that such a course of training is an adequate substitute for a medical qualification. The recommendation appears to be a deliberate attempt to render medical men ineligible for the appointment of coroner, and to remove the incentive for them to study for the Bar and thus qualify for the position of full-time officials, which the committee suggests is the goal to be aimed at. It should not be allowed to succeed.

CANCER CONSCIOUSNESS

Elsewhere in this issue will be found a review of a book on the early diagnosis of malignant disease compiled by five surgeons on the staff of the Mount Vernon Hospital, at Northwood, Middlesex. The object of the book is the education of the general practitioner of medicine in the recognition of those signs which should give rise to suspicion of the presence of malignant disease and the methods of investigating thoroughly every case in which such suspicion may have been aroused. It is admitted on all hands that with modern methods of treatment, properly applied, many, if not yet all, cases of cancer are curable if seen in a sufficiently early stage. It is recognized by the authors that in order to bring down the death rate from cancer much more is required than the gingering-up of the diagnostic acumen of the family doctor: of equal importance is the education of the public, allaying fears, calming prejudices, and confounding ignorance—on the whole, a far more difficult matter. While there can be no doubt of the vital importance of the doctor being constantly on the alert, it is probable that many more lives could, and would, be saved if only the public realized better the nature of the problem. It has to be admitted that the very thorough investigation of cases so strongly urged by all the authors of the book referred to is absolutely necessary for the discovery of cancer in all its varieties in an early and easily to be treated stage. At the same time one might venture to express the opinion that the education of the public will have to be carried a great many stages further before they will, without hesitation and without question, submit themselves to the rigorous, exacting, and expensive methods advocated, often on the grounds of suspicion only. In such cases it is difficult, if not impossible, for the doctor to take his patient completely into his confidence, and in the happy event of a negative finding it would be only human for the patient to protest with no uncertain voice that there has been a lot of fuss and considerable expense for nothing—"much cry and little wool." It often happens that the doctor is more worried through the difficulty of trying to convince a patient and his friends that something ought to be done than by ignorance of what advice to give.

The first thing to banish from the lay mind is *fear*: once the public has been persuaded that cancer need not of necessity be a cause for dread the battle will be half won. It is therefore exceedingly welcome news that the British Empire Cancer Campaign has recently set up a central propaganda committee, and that one of the activities of this committee is to organize lectures for the lay public, to be delivered by local medical practitioners. The scheme, which was started last autumn, is on trial in the counties of Hampshire, Sussex, and Kent. Local women's organizations and so on are approached and asked to apply for these lectures, and already thirty lectures have been arranged in two counties. Special propaganda leaflets are distributed among the audience. It is to be hoped that the experience gained in the Home Counties will in due course lead the way to the giving of such lectures throughout the whole country. It is notoriously difficult to enlighten the lay mind without frightening it, so the participation in the good work of an organization with the prestige of the British Empire Cancer Campaign is doubly to be welcomed.

HOSPITALS AND ANTI-VIVISECTION

The current issue of *The Fight against Disease* (vol. xxiv, No. 1), the journal of the Research Defence Society, contains an article and an editorial on the subject of bequests to hospitals limited by a condition that no vivisection be done in the building. The author has estimated that about £600,000 a year is spent in this country for anti-vivisection propaganda, three-fifths of it from legacies and only a little over a quarter from subscriptions and donations. The anti-vivisection societies obtain their funds, he says, largely through a facile appeal to sentiment aided by the "eternal gullibility" of the masses, who are unable to sift evidence. The last Royal Commission on experiments on living animals unanimously rejected all the reports of cruelty brought before them by the anti-

vivisection enthusiasts, saying, "After careful consideration of the cases we have come to the conclusion that the witnesses have either misapprehended or inaccurately described the facts of the experiments." What the author characterizes as the meanest of the activities of the "anti-societies" is their persistent attempt to divert subscriptions from the best equipped hospitals because they have of necessity to include on their staff a pathologist licensed to do inoculation experiments for diagnostic purposes, and their attempts to handicap the progress of the Royal Veterinary College in London. As the editor remarks, it is "hitting below the belt" to attack the appeals made by voluntary hospitals simply because somewhere in the building a pathologist is doing necessary diagnostic and therapeutic work which is only permitted if he holds a licence under the Act. *The Fight against Disease* appeals to the Press to help in bringing the deplorable waste of money on anti-vivisection to the notice of the public in order that those who appeal for funds may be called upon to show what benefit has accrued from their activities. The society could meet most of the public agitation with one-tenth of the income frittered away by the anti-vivisectionists, but even to do that it needs twice the support it now gets from medical men and women.

SUPPLY OF MEASLES ANTISERUM

Numerous unsatisfied demands for convalescent measles serum led to our recent note[1] on the source of supply. The reports of the L.C.C., of the Ministry of Health, and former numbers of this *Journal*[2] will readily convince the reader that the efficacy of convalescent serum is beyond debate. Serum taken from patients about a fortnight after defervescence will, if given within five days of exposure in a dose of 5 c.cm., provide complete temporary protection to infants or older children in poor health, and will, if given before the ninth day, allow only a mild or attenuated attack to occur, leading to active and long immunity. For treatment it is of doubtful or little value. Adult serum or blood is of help, but how potent is it and what dose should be used? There seems to be no general agreement on this question. It has been suggested that the antibody content of the circulating blood of a recovered patient loses three-quarters of its potency within three months. Various writers quote the necessary dose of adult serum as being two to five times that of convalescent serum. Obviously no accurate figure can be given, for different batches of mixed adult serum will vary much in their potency, and there is no known method of estimating this satisfactorily. There remains the further quaint source of antibody in human placentas. This completely rational source of supply is being largely employed in Russia, and to some extent in America, though, so far as we know, the Council of Pharmacy and Chemistry of the American Medical Association has not yet felt justified in recommending the material for general use. No clear evidence is available that a mother who has previously suffered from measles will have any special concentration of antibody in the placenta; hence placental extract is merely a substitute for adult serum. But can nothing be done to organize the supply of convalescent and adult blood on a larger scale? Professor C. C. Okell in 1932 said that blame rested on the medical profession, which had done very little to organize a service. Have we advanced much since then? Mr. P. L. Oliver by untiring and selfless energy built up the magnificent voluntary Blood Transfusion Service, now so ably managed by the Red Cross Society, with its 4,500 transfusions during 1935.[3] Will it require a medical man of similar driving force to devote himself wholly to the organization and collection of blood before the pitifully meagre amount of convalescent and adult serum now available may become equal to the calls of the many infant hospitals needing it, or will some gifted member of the British Medical Association or the Society of Medical Officers of Health take up the obvious challenge and resolve to reduce somewhat the 3,000 deaths of young children caused each year by this disease? Several investigators in the past have suggested methods of active immunization against measles by giving convalescent serum either before or immediately after virus has been injected (either blood taken from children during high fever and injected, or filtrate from the nose of an affected child applied to the nasal mucous membrane). Owing to the obvious difficulties of investigation of these methods they have not come into general use. Similar methods have proved themselves of high value in veterinary prophylaxis, notably rinderpest, hog cholera, and dog distemper, and they may be well worth the attention of some immunologist with appropriate facilities.

[1] *British Medical Journal*, February 15th, 1936, p. 325.
[2] *British Medical Journal Supplement*, 1935, i, 286; *An Outline of Immunity*, by W. W. C. Topley, 1933, p. 351; *Recent Advances in Vaccine and Serum Therapy*, by Fleming and Petrie, 1934, p. 165.

OESTRIN AND THE PREMATURE BABY

It was suggested by Aschheim nearly ten years ago that the premature baby who was not progressing well might be favourably influenced by the administration of oestrin. It was argued that the baby born before term is at a disadvantage because it lacks the stimulus of the oestrin which would have continued to abound in its blood until the full term of pregnancy had the foetus remained *in utero*. The absence of this stimulus was held to be responsible, at any rate in part, for the drowsiness and generally depressed condition of metabolism which constitute the major handicap of the premature baby in the early days of life. Since the original suggestion there have been conflicting reports from various centres, and Dr. Alan Moncrieff has now attempted in this country to settle the problem of whether oestrin has any value in this particular field. In the current number of the *Archives of Disease in Childhood*[4] he records an investigation conducted at Queen Charlotte's Maternity Hospital whereby alternate babies weighing 5 lb. or under have received treatment by injections of oestrin or of an inert solvent solution as used for the oestrin. The material injected was designated merely by letters so that the nursing staff were unaware of which babies received treatment and which did not, and, in this way, what the author terms contemporary controls were obtained. The dosage used was either 100 mouse units of trihydroxyoestrin (oestriol) or, in the later part

[3] *Blood Transfusion Service Quarterly Circular*, January, 1936.
[4] February, 1936, ii, 9.

of the investigation, 100 international units of keto-hydroxyoestrin (oestrone) per pound body weight daily in the first seven days of life. Altogether eighty premature babies were treated or served as controls, and those receiving oestrin did show a very slightly better gain in weight than the control series. Those babies who received the larger doses of oestrone were above their birth weight on the fourteenth day by 3.3 per cent. of that weight, whereas the control babies were still by 3.1 per cent. under weight. Improvement in the treated babies was more obvious in the girls than in the boys. Dr. Moncrieff concludes that the advantages produced are not definite enough to warrant the use of oestrin as a routine method of stimulating premature babies.

THE LEPROSY CAMPAIGN

Rather more than a hundred years ago one of the most inhuman scourges was abolished throughout the British Empire. It took years to effect the complete abolition of slavery after Wilberforce's long efforts were crowned by the Act which decreed the illegality of slavery in Her Majesty's colonies and protectorates. This great measure was accomplished as a result of public opinion demanding that "such things shall not be." The Council of the British Empire Leprosy Relief Association has set itself a task even more arduous, for its object is the banishment of leprosy from the Empire.

These sentences occur in Sir Edward Gait's foreword to the annual report of the B.E.L.R.A. for 1935. He points out that whereas Wilberforce had in the end the full strength of an educated public opinion behind him, the association has yet to enlist the support of a fully enlightened public. Few realize that of the world's population at least one person in every 370 suffers from leprosy, and that in the British Empire there are at least two million sufferers. No Act of Parliament will abolish leprosy; it needs years of patient research, men willing to undertake the work, and the means to pursue it. At the meeting of the General Committee of the Assocation held at the India Office this week, with Lord Zetland in the chair, Sir Leonard Rogers, the honorary medical adviser, touched again on the importance of house inspections in the discovery of early cases. "Such home visits reveal many unsuspected early cases in children, who are specially amenable to treatment; for I have long urged that if child infections can be prevented the disease would practically die out within two generations." The greatest progress in the campaign has been made in India, where by active propaganda the people have been roused to help in stamping out leprosy from their midst. In other affected parts of the Empire the Association has accomplished a great deal of useful work. The medical secretary, Dr. Robert Cochrane, feeling that the time had come for him to resume active work in the field, has now gone as medical officer in the Lady Willingdon leper colony at Chingleput. The Association has been fortunate in obtaining as his successor Dr. Ernest Muir, recently retired from the charge of the Leprosy Department in the Calcutta School of Tropical Medicine. Dr. Muir, who also addressed the meeting, will shortly leave for West Africa to investigate the leprosy problem in Nigeria, the Gold Coast, and Sierra Leone.

THE NEW ERGOT ALKALOID

In 1935 much interest was aroused by the announcement in British, American, and Continental journals that new active alkaloids had been isolated from ergot which had as one of their chief characteristics the ability to stimulate the puerperal uterus to rhythmic activity. In spite of some discrepancies in the evidence, it appeared that the alkaloids, named, respectively, ergometrine, ergotocin, ergobasine, and ergostetrine, were so similar in their chemical and pharmacological properties that there could be little doubt that these alkaloids were identical substances.[1] At the "Medizinische Woche" at Montreux Sir Henry Dale stated than an agreement had been reached whereby samples of ergometrine and ergobasine would be exchanged and examined by the two sets of workers in order to establish once and for all the identity and non-identity of the substances. The hope was also expressed that a like arrangement might be made with the two groups of American workers (ergotocin and ergostetrine). This has now been done. In a letter to *Nature* of March 7th, signed by M. S. Kharasch, H. King, A. Stoll, and Marvin R. Thompson, it is stated that:

"Our comparisons of the melting-points and mixed melting-points of the four alkaloids and of certain of their salts, and of their optical activities in different solvents in cases where sufficient material was available, leave us in no doubt that the alkaloid obtained in the four different laboratories was the same substance, and that the four names given to it are synonyms. Having reached that conclusion, we are content to leave to the world of science the choice of one of these names for adoption into scientific literature as the recognized name of the one alkaloid."

Summing up the situation in the American journal *Science*,[2] Sir Henry Dale made out a very strong case for the adoption of "ergometrine" as the standard and international name for the new substance.

VITAMINS IN BEER

The vitamin content of beer is a subject of topical interest, partly because a content of vitamins has become an asset to any food material from the point of view of advertisement. English workers[3] [4] showed ten years ago that beer contained a certain amount of vitamin B complex but very little of vitamins A, C, and D. Donovan and Hanke[5] have made quantitative measurements of the vitamin B content of five samples of American beer. They measured the content of vitamins B_1 and B_2 separately by means of feeding experiments on rats. They found a small content of both these vitamins, but their chief conclusion is "at best, beer is a very poor and inadequate source of vitamin B for rats, and probably also for humans."

We regret to announce the death of Sir James Magill, K.C.B., M.D., Colonel late R.A.M.C., at the age of 86; also of Mr. John W. Dowden, past-president of the Royal College of Surgeons of Edinburgh, at the age of 70.

[1] *British Medical Journal*, 1935, ii, 1114.
[2] *Science*, clxxxii, No. 2118, p. 99.
[3] Southgate, H. W.: *Biochem. Journ.*, 1924, xviii, 769.
[4] Harden, A, and Zilva, S.: Ibid., 1924, xviii, 1129.
[5] Donovan, P. B., and Hanke, M. E.: *Proc. Soc. Exper. Biol. and Med.*, 1936, xxxiii, 538.

TREATMENT IN GENERAL PRACTICE

This article is one of a series on the management of some diseases of the digestive system met with in general practice.

MANAGEMENT OF DISEASES OF THE GALL-BLADDER AND BILE DUCTS

BY

J. W. McNEE, M.D., D.Sc., F.R.C.P.

This article is meant to be practical, and is therefore dogmatic. References to the scientific and experimental data, and even the names of the chief workers in this field of medicine and surgery, are for brevity almost excluded.

It has been recognized only comparatively recently that inflammation of the gall-bladder (cholecystitis) is the commonest of all intra-abdominal diseases, and attempts have been made to investigate the early stages with a view to preventing the late sequels. The rapid development of intra-abdominal surgery has taught us an enormous amount about gall-stones and other late complications of diseases of the gall-bladder and bile ducts, and for a long time our ideas of diagnosis and treatment were built around what may be termed for brevity a "late pathology." Moynihan's oft-quoted "inaugural symptoms of gall-stones" are now universally recognized to be those of the preceding cholecystitis, but even then they are generally the indication of a later stage than practitioners must attempt to recognize and treat. My experience as an examiner has shown me that the idea that these symptoms occur mainly in a woman who is "fair, fat, forty, and fecund" still appears to be thought all-sufficient, but it must now be emphasized that:

1. Cholecystitis occurs at all ages, even in childhood, and in both sexes, although females, for certain definite reasons, still preponderate.

2. Cholecystitis, although so common, is seldom recognized at present in its earliest stages, and it must be admitted that diagnosis is difficult unless a definite attempt is made *to investigate properly all forms of indigestion which resist simple treatment.*

Causation of Diseases of the Biliary Tract

For practical purposes nearly all diseases of the biliary tract (excluding only uncommon conditions such as the dysfunctions, the solitary cholesterol stone of metabolic origin, tumours, and parasitic infestations) begin as one or other grade of inflammation, so that this part of our subject consists mainly of a consideration of the causes of cholecystitis. The essential features are the settlement of micro-organisms in the biliary tract, what predisposes to them, how they reach there, what site they flourish in, and what varieties of microbe are concerned.

As to predisposing causes, all are agreed on the importance of biliary stasis, due to obesity, over-eating, chronic constipation, lack of exercise, and repeated pregnancies. The importance of focal sepsis in teeth, tonsils, sinuses, and elsewhere, as predisposing causes, stands scientifically on much less firm ground.

The route by which microbes enter the biliary tract to settle there is still in dispute. The possibilities are the blood stream (portal or systemic), ascent of the ducts from the duodenum, lymphatic spread from the liver, and adhesions to other inflamed viscera near by. Much work must still be done to decide this point, but the general view held at present is that the blood stream is the most important route.

The micro-organisms concerned and the site in which they flourish are also in dispute, which is unfortunate, because an important line of medical treatment is here involved. The investigations have been of two kinds: (1) the bacteriological examination of the bile, the gall-bladder wall, and the lymphatic gland draining the biliary tract, in specimens removed by the surgeon under aseptic conditions; (2) the examination of bile drawn off by the method of duodenal intubation. The results of these two methods in the main do not agree. According to the surgeons the bile from the gall-bladder is often sterile in the presence of active disease, while cultures of the wall of the gall-bladder itself show almost always the presence of a streptococcus. Duodenal drainage, on the other hand, has in the hands of different observers yielded much more commonly the *B. coli* or some member of the coliform group. Infections of the bile with typhoid and paratyphoid bacilli form a small, well-recognized group. If the seat of the infecting organism is in the depths of the gall-bladder wall and seldom in the bile itself, then obviously no "disinfectant" of the bile, as it passes from the liver to the biliary tract, can be expected to cure the microbic infection, but only some remedy carried in the blood or some indirect method such as vaccine therapy. It is unfortunate for our patients that this difference of opinion exists. It seems best at present to regard the investigations of the surgeons as dealing with later and more chronic infections which have required operation; and, with the positive knowledge of infection of the bile itself in typhoid fever, to regard earlier cases as amenable to medical methods described below.

Certain Methods of Investigation

Apart from the essential clinical investigation—history, symptoms, and physical signs—two methods of fairly recent introduction now play a considerable part in the investigation of a case of biliary disease.

1. *Cholecystography.*—This was introduced by Evarts Graham of St. Louis and his associates in 1924. An *x*-ray method for diagnostic purposes only, it has its chief value in the late stages of biliary disease, and particularly when gall-stones are present. It is of limited value in early cases of cholecystitis.

2. *Duodenal Intubation or Duodenal Drainage.*—This is carried out by introducing a narrow rubber tube through the stomach into the duodenum and causing contraction of the gall-bladder by various means, most commonly by the administration through the tube itself of a concentrated solution of magnesium sulphate. Chiefly developed by Vincent Lyon and his associates in Philadelphia, this is a method both of investigation and of treatment by "non-surgical biliary drainage." It is far too little used in Britain, chiefly because the wrong metal tip at the end of the tube is commonly employed. Everyone is now quite familiar with the fractional test meal for which the tube, with its small rubber-covered ovoid end and small holes to suck out the gruel meal from the stomach, is admirably adapted. Unfortunately the small ovoid tip does not readily pass through the pylorus into the duodenum, and the pyriform metal tip used by Vincent Lyon is much to be preferred; it is now obtainable

from Messrs. Mayer and Phelps, 59, New Cavendish Street, London W.1.

A practical fact also to be noted is that the rubber tube, to which the metal tip is attached by a tying of silk, is supplied in America of greater stiffness and smoothness than appears to be possible for the rubber manufacturers in this country. These are small matters of detail, but they count greatly in performing the technique.

FULL SIZE

The tests of hepatic function so far introduced are definitely not of great value in the elucidation of biliary disease in its early stages.

Dysfunctions of Gall-bladder (Biliary Dyskinesia)

Functional disturbances of the gall-bladder and biliary tract—spastic and atonic—must obviously be considered first, as the name connotes an absence of organic disease. Such cases are rare, and fortunately are not likely to trouble the practitioner greatly. The clue to their origin is believed to be a functional disturbance of the sphincter of Oddi at the biliary papilla where it enters the duodenum. The spastic variety, which results in distension of the gall-bladder, shows itself clinically either as a persistent dull ache below the ribs or may even simulate gall-stone colic. The occurrence of the atonic variety is, it must be admitted, only inferred. Treatment applies only to the spastic variety, and belladonna should be given in full doses. A mixture containing rhubarb, or the homely Gregory's powder, is also recommended.

Different Grades of Cholecystitis

The mildest variety is known as *simple catarrhal cholecystitis*, and is believed to be associated with a very low grade infection, which, however, may unfortunately progress to serious pathological consequences. It is at this early stage that a diagnosis should be made, but this is at present far too seldom done. There may be no definite symptoms or physical signs directly referable to the gall-bladder, and the usual clinical features are epigastric fullness, flatulent dyspepsia, and nausea. These are often termed "biliousness," which is a symptom-complex of many diverse origins. In this condition *x*-ray diagnosis, by cholecystography, is valueless in the earlier and important stages, and may, indeed, lead to error. The cystic duct may be partly obstructed by the catarrhal inflammation of the mucosa, and bile containing the dye may fail to enter the gall-bladder, thus leading to the suspicion of much more serious organic disease. As a rule, however, the gall-bladder shadow and the capacity of the gall-bladder to concentrate the bile and the dye, and to empty itself partially, are entirely normal.

The duodenal tube may give great help in diagnosis at this stage, but it will give even more when the condition has persisted for some time. The interpretation of the results obtained by drawing off the bile has been greatly elaborated, but in practice I am content with the following observations.

The bile obtained is immediately centrifuged, and films of the sediment are stained by Gram's stain and by methylene-blue. The presence of a number of pus cells is virtually diagnostic, and if chains of streptococci or fairly numerous coliform bacilli are seen the diagnosis is certain. (For brevity, the part of the technique which excludes the possibility of pus cells coming from the stomach is here omitted.) Bacteriological cultivation of the bile obtained is, in my view, only of importance in the diagnosis of typhoid cholecystitis. Strict asepsis in passing the tube into the duodenum is impossible, and one microbe carried in by the tube from the stomach may, after multiplication in culture, lead to an entirely erroneous conclusion.

In the later stages of catarrhal cholecystitis the clinical symptomatology does not change greatly, and now constitutes in reality the preceding or inaugural symptoms of gall-stones.

Somewhere in this group may be placed the condition known to surgeons as "strawberry gall-bladder," although the origin of this condition is uncertain and may be metabolic rather than inflammatory. At all events the clinical features which have led surgeons to remove gall-bladders of this type are those of catarrhal cholecystitis. The strawberry gall-bladder shows a reddened mucosa with yellowish specks (of cholesterol), and it is claimed that the condition can be definitely recognized by duodenal drainage, but I have no experience of this.

Treatment

The treatment advised in catarrhal cholecystitis is as follows. Fats, contrary to what is often taught, should not be entirely omitted from the diet, as they are the natural means of emptying the biliary tract. Butter, milk, cream, and olive oil are not, as a rule, contra-indicated, in moderation: it is cooked fats and fried foods which aggravate the flatulent distension. With the knowledge that gall-stones may be the sequel of chronic catarrhal cholecystitis, articles of diet rich in cholesterol (such as egg-yolk) are often forbidden, but there seems no reliable scientific evidence that the amount taken could influence the total cholesterol content of the blood or the bile. A cholagogue of some bile-salt product is useful, and a pill sometimes prescribed (Vincent Lyon) is:

℞	Sod. oleat.	gr. iij
	Sod. glycochol.	gr. iij
	Sod. salicyl.	gr. iij
	Ol. pip.	♏ j
	Excipient	q.s.

To be taken three times daily after meals.

A laxative is often necessary, and pulv. rhei co. is one of the best. Non-surgical biliary drainage should be employed, three times weekly, by the following method. As has been indicated, a solution of magnesium sulphate is passed down the duodenal tube to induce contraction and partial emptying of the gall-bladder for diagnostic purposes. It has been found equally efficient *for treatment* when the solution is taken by mouth. In practice I give the following directions. Magnesium sulphate, 25 per cent. solution in water, with a flavouring agent such as syrup of orange, is prescribed. The patient is directed to take, on an empty stomach, 1 drachm or more of the medicine in a wine-glass of water immediately on waking. The dose may be varied and increased, but not sufficiently to produce a definite purgative effect.

Hexamine in large doses of 120 grains or more, accompanied by an alkali to prevent irritation of the urinary tract, has been greatly recommended, either alone or

combined with a bile-salt product. It is impossible to be dogmatic on the value of this drug, and advocates and detractors are possibly in about equal proportions.

Finally it must be emphasized that the medical treatment of catarrhal cholecystitis must be persistent and prolonged for many months. Relapses are frequent, and if the disease is allowed to pursue its course unchecked gall-stones are the common sequel.

The Acutely Infected Gall-bladder

In acute infective cholecystitis, acute suppurative cholecystitis, phlegmonous cholecystitis, and empyema of the gall-bladder the distinction from simple catarrhal inflammation may be difficult, but as a rule these conditions start acutely and violently, and are recognizable by ordinary clinical methods. The patient suddenly suffers from nausea, acute pain and tenderness over the gall-bladder, fever, and vomiting. The leucocyte count is raised. Here the differential diagnosis is the important matter, especially from acute conditions affecting the appendix, right kidney, or duodenum. Cholecystography is both useless and inadvisable in the acute stage. Duodenal drainage will show pus cells and micro-organisms in the bile, but is seldom carried out. The immediate treatment is expectant, consisting of rest, sedatives, and starvation—except for the free administration of glucose in solution. If the acute infection clears up, non-surgical biliary drainage, by the method indicated, must be persisted in, and the treatment previously outlined for the milder catarrhal cholecystitis also followed. On the other hand, the infection may lead on at once to suppurative or phlegmonous changes, or to empyema of the gall-bladder, when the treatment becomes obviously surgical.

Chronic Cholecystitis, with or without Gall-stones

There is no need to elaborate this section, except to point out that the sequel of a long-standing cholecystitis may be either a small, thickened, and deformed gall-bladder, or one containing stones. Here the diagnosis is adequately made by ordinary clinical methods, and it is in this group that cholecystography as an ancillary clinical method comes into its own. In spite of the much-advertised medical cures, by olive oil or by other methods, it may be stated categorically that once gall-stones have been proved to exist there is no known hope of cure except by surgery.

Hydrops or Mucocele of the Gall-bladder

Here the cystic duct is obstructed permanently, either by stone or stricture, and the gall-bladder gradually distends with a clear mucous secretion. The condition must almost certainly give rise to clinical symptoms at first, but they are frequently missed, and the large globular swelling is often found quite accidentally and merely presents a problem in abdominal diagnosis. The condition may be mistaken for a Riedel's lobe, a movable right kidney, hydronephrosis, or even, in obese women, for an ovarian cyst. The treatment is purely surgical.

Parasitic Infestation of the Biliary Tract

This is a rare condition, and in Britain the only parasite concerned is *Ascaris lumbricoides* (roundworm), which may enter the biliary tract from the duodenum and completely block the ducts. Obstructive jaundice supervenes, and the gall-bladder may be distended. The only method of diagnosis is to examine the stools for ova in all unusual cases of obstructive jaundice. The treatment is surgical.

Tumours of the Gall-bladder

These are fortunately uncommon, but carcinoma is one of the recognized complications of gall-stones. Simple tumours occur also, but are excessively rare. Diagnosis is always difficult in the early stages, and cholecystography is not of much help. Surgery is the only possible treatment, but prognosis is always bad in malignant tumours in this region.

Medical Pre-operative and Post-operative Treatment

Surgeons are agreed that to reduce the operative risk intensive pre-operative treatment may be essential in gall-stones and other diseases of the biliary tract. Great obesity, diabetes, intense jaundice—to name only a few complications—may require careful treatment before operation can be contemplated. The liver is always to some extent damaged or deranged in function, and even after a successful operation the general treatment applicable to cholecystitis is required for some time. Administration of glucose daily before operation is of great value, and is indeed the chief drug to employ.

The treatment of patients with "surgical" biliary diseases who refuse operation, or are too old, or suffer from other diseases which prevent operation, is a difficult and complicated matter, and cannot be considered here.

In conclusion, two points seem worthy of mention. First, the practitioner must not forget, in the differential diagnosis of biliary diseases, the possibility of a lesion outside the abdomen. Coronary thrombosis, acute right-sided basal pneumonia, diaphragmatic pleurisy, and even incipient herpes zoster, have all led to error. Secondly, he must remember that the gall-bladder is an organ with definite and important functions of value to the body, and every possible effort should be made to conserve it.

ROYAL MEDICAL BENEVOLENT FUND

This is the centenary year of the Fund, and a special appeal is being made for new subscribers to carry on the work begun a hundred years ago, since when £398,055 has been distributed in charitable allowances. Cheques should be sent to the Honorary Treasurer, Royal Medical Benevolent Fund, 11, Chandos Street, Cavendish Square, London, W.1.

At a recent meeting of the committee thirteen new applicants were assisted and twenty-nine grants were renewed to beneficiaries on the books of the Fund; in all £1,029 was voted. The following particulars of a few of the cases helped indicate the kind of work undertaken.

Dr. X., aged 77. Retired from practice in 1925. Is now suffering from arthritis and severe sciatica, and finds walking difficult. His savings are exhausted, and he is living with his married son, whose means are only £2 a week. The Fund voted an emergency grant of £5 and a maintenance grant of £40, payable in four instalments.

Widow, aged 36, of M.B. who died in June, 1935, leaving his widow and two children penniless. The widow is to take up training in chiropody, and the Fund voted a maintenance grant of £36, payable in four instalments. The Ladies' Guild will assist in the educational expenses of the children.

Dr. Y., aged 79. Has outlived his savings and finds its extremely difficult to get locumtenent work at his age. Fund voted £40, payable in four instalments.

Daughter, aged 63, suffering from tuberculosis of mesenteric glands. Resides in Switzerland for the sake of her health. A grant of £26 was voted by the Fund towards her medical expenses.

The following letter has been received from the son of a deceased medical practitioner aged 88, who was in receipt of a Fund's annuity up till his death in 1936:

"May I take this opportunity once more of thanking the committee for the manner in which my father's annuity from the Fund was administered. It was very largely instrumental in making his closing years comfortable and peaceful."

MEDICAL RESEARCH COUNCIL

ANNUAL REPORT FOR 1934–5

A general survey of the work of the Council is given in a leading article at page 536 of this issue. Here, and in a subsequent issue, we shall refer in more detail to some of the researches carried out under its auspices.

Virus Infections

The hope that the virus of influenza might be transmitted from human beings to mice has not been realized, but passage from man to ferret, and then from ferret to mouse, has been successfully repeated. Eight new strains of virus obtained during an epidemic of influenza at Shorncliffe, and two strains supplied by Dr. Francis of the Rockefeller Institute have been compared by Laidlaw, Andrewes, and Wilson Smith with the original strain, which is still being maintained by animal passage. It has not been possible to detect any difference between these ten strains, all obtained from cases of typical influenza. The virus has been cultivated on the chorio-allantoic membrane of the developing chick, and still more successfully in a saline medium containing fragments of surviving tissue from a chicken embryo. This latter method has proved of value in the cultivation of other viruses.

Certain experiments in immunity hold out some hope for the future. Resistance to influenza can be raised in mice and ferrets by subcutaneous injection either of the living virus (not infective by this route) or of a formalinized vaccine. Some success has been achieved by treating infected mice with anti-influenza serum obtained by immunizing a horse. It is possible that such a serum may be of value in treating influenzal pneumonia.

Louping-ill

The resemblance between the disease known as louping-ill in sheep and "X disease" in human beings lends special interest to work on the former. "X disease" is an infection of the central nervous system: there were several outbreaks among the sheep-farming community in Australia between 1917 and 1926. If the virus of louping-ill is inoculated intracerebrally into the monkey (or the sheep) it appears early in the circulating blood; when instilled into the nasal passages of the monkey the virus is apparently from the first localized strictly to the central nervous system and does not appear in the blood. Investigating monkeys infected with "X disease" Perdrau found that in these animals there was a meningo-myelo-encephalitis, with widespread destruction of the Purkinje cells of the cerebellar cortex—a pathological picture closely resembling that found in monkeys infected with louping-ill. Different lesions, however, were found in fatal human cases of "X disease."

Photodynamic Inactivation

Reference has been made in previous reports to the inactivation of different viruses and bacteriophages by the action of light in the presence of dyes such as methylene-blue and acriflavine. It was found that rabbits could be given a fair degree of immunity against the fixed virus of rabies by inoculation with the photodynamically inactivated virus. Protection can also be given against the "street" virus obtained directly from a rabid dog. An interesting observation is that certain bacterial spores are killed more easily by photodynamic action than by other methods. Anthrax spores, which are highly resistant to heat and to chemical disinfectants, are killed by one hour's exposure to light from a 300 c.p. Osram lamp in the presence of a solution of methylene-blue.

Advances in Microscopy

Mr. J. E. Barnard and his co-workers continue to improve microscopical methods. On the mechanical side they have designed a new microscope stand by means of which any material located by observation with visible light can be transferred at once to a corresponding position on the ultra-violet microscope for photography. A new quartz objective, made by Zeiss of Jena to Mr. Barnard's specification, is now used with a wave-length of 257 millimicrons. This makes it possible for photography of dark-ground images to be applied to smaller particles than hitherto, and real critical images can now be obtained with the transmitted rays of virus bodies that were formerly too transparent to waves of 275 millimicrons to be photographed at that wave-length, save by dark-ground illumination.

Transmissible Tumours

Drs. Gye and Purdy have been unable to confirm the observations of some other workers that fowl sarcomata, produced in the neighbourhood of injections into the tissues of solutions of tar or of dibenzanthracene, can be transmitted by a cell-free filtrate. With Professor Ledingham Dr. Gye demonstrated by high-speed centrifugation of filtrates the active agent of the Rous chicken sarcoma, which was deposited in the form of elementary bodies considerably smaller than those of vaccinia. Further studies of the infective papilloma discovered by Dr. Shope in a wild cotton-tail rabbit show that it can be transmitted in the species of its origin by cell-free filtrates.

Bacteria and Bacterial Chemistry

Mr. Bruce White and Dr. Gardner have confirmed the observation of Japanese authors that there are serological subtypes of the true *V. cholerae*. This should give the needed basis of discrimination between the pathogenic and non-pathogenic vibrios. Mr. White has isolated "rough" (R) variants of many strains of the cholera vibrio, and found that the R forms from all strains of the true *V. cholerae* were identical, whatever serological differences they had shown in the "smooth" (S) condition.

Further work has been done on the preparation and serological properties of a specific carbohydrate antigen and of an alcohol-soluble protein from cholera vibrios. The practical result of these studies has been the preparation of stocks of stable antigens, and this should lead to a more satisfactory preparation of specific agglutinating sera for *V. cholerae*.

Sex Hormones

There has of recent years been a rapid development in the chemical knowledge of the group of related compounds which include the sterols, bile acids, and sex hormones. There is, however, but little knowledge as to how the animal body converts the cholesterol of the tissues and bile to the coprosterol characteristic of the faeces, or as to the way in which cholesterol is transformed to bile acids or to the sex hormones.

A form of the male hormone, known as androsterone, which appears in the urine, can be produced artificially from cholesterol. Other artificial compounds made by Professor Ruzicka have been investigated, but none equals in activity the "testosterone" obtained from the testis by Professor Laqueur. Recently the synthesis of a substance identical with "testosterone" has been carried out by Ruzicka and Wettstein in Switzerland, and by Butenandt at Danzig. It is therefore possible that testosterone may be adopted as a standard in place of the urinary androsterone. (See article by Deanesley and Parkes in this week's *British Medical Journal*, p. 527.) An international conference, under the chairmanship of

Sir Henry Dale, has done valuable work in the adoption of agreed standards for the sex hormones and, what is almost as important, of uniform nomenclature for these hormones.

Interesting studies by Dr. Parkes and his co-workers show that certain plumage effects in the cock, known to be dependent on the presence of the testis, are produced in capons not by androsterone but by oestrone. Similarly, the growth of the comb in the hen, dependent on the ovary, is produced not by oestrone but by androsterone. Therefore it appears that the testis can secrete a female hormone and the ovary a male hormone, and that sex distinction depends upon the preponderance of one or the other hormone, and not upon their exclusive production by either the male or the female. (See *British Medical Journal*, February 8th, 1936, p. 257.)

It has been suggested that in senescence of the male the male hormone may lose its preponderance, and that prostatic enlargement may be due to the "unopposed action" of the oestrogenic hormones. Enlargement of the prostate in rats has followed injections of oestrone. But it has yet to be shown whether administration of the male hormone can be applied clinically in cases of prostatic hypertrophy.

Pharmacology of Ergot

Reference is made in the leading article on page 536 of this issue to the work on the alkaloids of ergot, and the publication by the late Dr. H. W. Dudley and Dr. Chassar Moir in 1935 of a description of the new alkaloid ergometrine. Since then three separate accounts of a "new alkaloid" have appeared in America and Switzerland. These other investigators have given different names to the alkaloids isolated by them, alkaloids which are "almost certainly identical with ergometrine. When once this identity has been certainly established (see *Nature*, March 7th, p. 403), it is obviously important that confusion in the literature should be avoided by agreement on one common name for scientific use." Dr. G. L. Brown and Sir Henry Dale have now published a fuller account of the pharmacology of ergometrine. It has practically none of the characteristic "sympathicolytic" action of the previously known ergot alkaloids. Ergometrine induces a powerful and persistent rhythmic activity of the puerperal uterus: this activity is more rapid in onset and more rhythmic in character than is produced by the other ergot alkaloids, and it does not lead to the toxic effects produced by them such as gangrene and paralysis of sympathetic actions.

Chemical Transmission of Nervous Effects

Dr. Marthe Vogt, with Sir Henry Dale and Dr. Feldberg, have shown that stimulation of the motor nerve fibres to a muscle paralysed by curare results in an output of acetylcholine quite similar to that observed when the unpoisoned muscle contracts in response to motor nerve impulses. As with autonomic nerves, acetylcholine, then, acts as the chemical transmitter of nervous impulses from motor nerves to voluntary muscle.

Some interesting observations have been made by Drs. Brown and Feldberg on the effects of potassium ions on the artificially perfused ganglion. In small doses the ions reinforce the effects of submaximal preganglionic stimuli: larger doses directly stimulate the ganglion cells and cause a liberation of acetylcholine into the perfusing fluid. "If, according to an already familiar conception, the impulse travelling along a nerve fibre involves a mobilization of potassium ions, the suggestion arises that this process, on reaching the preganglionic ending, causes liberation of acetylcholine, by which the excitation is transmitted across the synapse to the ganglion cell."

(*To be continued*)

New Zealand

[FROM OUR CORRESPONDENT]

The Hospital System

It is well known that the public hospitals of New Zealand are financed through rates levied on property owners, an approximately equal amount from Government revenue, and payments by patients. Legacies and donations are small owing to the almost general belief that the cost of hospitals is too much for private charity. Recently there has been a conference of delegates from the New Zealand Hospitals Association, from the Municipal Associations of New Zealand, and from the New Zealand Counties' Association. There are forty-seven hospital districts in the Dominion, with at least one large hospital in each district. The maintenance of these hospitals costs nearly £1,500,000 annually; in addition, building construction, the repayment of loans, and other minor charges amount to £250,000. For the last year for which figures are available—that is, 1933–34—payment from patients amounted only to one-fifth of the total hospital revenue.

At the conference it became evident that there was dissatisfaction with the incidence of levies from ratepayers, and rural ratepayers considered that they paid more in the aggregate than urban ratepayers and received less benefits. It cannot be denied that in other ways rural ratepayers are more generously treated than those in urban districts, and it is not possible to hold the balance even and please all parties, even in a system such as the New Zealand hospital system, which its most ardent supporters hold to be as perfect as human wisdom can devise. The critics of the present basis of levy on local bodies by way of rates have various suggestions for raising money for the mounting cost of public hospitals. Some advocate private wards as an additional source of revenue; others wish to place the whole cost on the Government, which already finds by taxation £700,000 a year for hospitals; others want the levy on local bodies to be assessed on a population basis; and yet others wish the hospitals to be paid for by a universal levy on the adult population of the Dominion.

In New Zealand there is nothing in the Hospital Act to prevent anyone, no matter how wealthy, from obtaining treatment in the public hospitals; the idea of a wage or income limit is distasteful to the democratic views of a large section of the community. The increase in the burden of cost is due mainly to the increased number of people making use of the public hospitals. The question of an equitable basis of levy on ratepayers for hospital maintenance was not the only matter discussed at the conference. If hospital benefit is to be provided under the national health service which it is proposed should be established, the whole system of hospital finance must be considerably modified. Is the insured person who needs in-patient treatment to receive any financial benefit himself, or are all funds for this purpose to go directly to the hospital concerned?

Suggestions for Improved Hospital Service

Suggestions for the improvement of hospitals in New Zealand are contained in the report of the hospital committee of the Royal Australasian College of Surgeons (New Zealand section). They do not differ in substance from the recommendations made several years ago by a committee of the New Zealand Branch of the B.M.A. The College of Surgeons emphasizes that the visiting staff system should be adopted in preference to the closed or so-called one-man system in any town where there are enough medical practitioners to provide a capable and approved staff. A progressive standard of good surgical or medical service to the whole community cannot be maintained if private practitioners are debarred from the benefits of hospital experience. The College also specifies standards for cottage, district, and base hospitals. An illuminating list of certain types of cases not suitable for

treatment in district hospitals, as distinguished from base hospitals, has been compiled by the Hospital Committee of the College. This list covers a large part of the field of major operations, and may not bring ready approval from the staffs of the larger district hospitals. The list may be too comprehensive, but if its effect is to lessen the number of major operations performed in small hospitals in small towns it will be a consummation devoutly to be desired.

A National Health Insurance Service

It is the declared intention of the new Government in New Zealand to establish a National Health Service. The Minister of Health has stated that nothing will be done until all parties interested have been heard, and there will be no legislation until after the next session of Parliament. It is expected that the scheme to be adopted will be on the lines of the British one, and financed by compulsory contributions from employers and employees subsidized by the Government. If medical, dental, and hospital treatment is to be provided, and, in addition, anything in the way of insurance against unemployment, the cost will be a matter for serious consideration. A Departmental Committee has reported in favour of a National Health Service, and so also have the Hospital Boards Association and the New Zealand Branch of the B.M.A. The general principle is affirmed by all, but the details, including the difficulties of finance, remain for settlement. A general outline will be provided by the Department of Health and will serve as a basis for negotiation with the medical profession, the hospital authorities, the friendly societies, and other bodies concerned. The Minister of Health is willing to hear all suggestions or criticisms, and is anxious to have a workable arrangement under which the public and the medical profession will be in harmony. He fully recognizes that any scheme which is repugnant to the medical profession will not be of much service to the insured, and this attitude on his part is comforting to a large section of doctors in New Zealand, who are not at all sure of their future prospects. The national health insurance service in England, which has the approval of the B.M.A., will be a useful guide for New Zealand, but will need many modifications to meet such local conditions as State- and rate-aided hospitals in forty-seven districts, no wage-limit for admission to hospitals, a comparatively small wealthy class, sparsely settled rural country, long distances, heavy general and local taxation, and grave national indebtedness and heavy interest charges.

Otago Medical School

The Senate of the University of New Zealand has had forced upon its attention special problems confronting medical education in New Zealand owing to the inability of the Otago University Medical School to accept for training more than approximately sixty students yearly. The smallness of the hospital in Dunedin—288 beds for general cases—presents a difficulty, and there has been some agitation in Auckland for a medical school in that city. A committee of the Senate reports that the tendency in Dunedin has been to give relatively more time, as compared with the practice in British universities, to chemistry, physics, anatomy, physiology, bacteriology, and public health, and to carry this work to a standard beyond that usually demanded of those qualifying for a pass degree. The committee suggests that there is a lack of balance, and that early training is developed at the expense of the clinical training. It requests the medical faculty to report on this criticism and to consider if it would be an advantage to allow students to study in the fifth year, as well as in the sixth year, in other centres. A few years ago a committee of the Medical Registration Council of New Zealand reported on the final examinations of the medical school, and stated that although the general standard was high the clinical material available was insufficient in the Dunedin Hospital for teaching and for examination purposes. This report at that time was submitted to the Senate of the New Zealand University.

Scotland

TRAINING OF NURSES

The report of the Scottish Departmental Committee on the Training of Nurses, which was appointed by the Secretary of State for Scotland to inquire into the training and system of registration of nurses in Scotland and to make recommendations, has now been issued.

Defects in the Present System

The committee expresses the opinion that as regards the approach to the nursing profession sufficient means have not been adopted in the past to encourage entrants, and recommends that steps be taken by the appropriate authorities to bring to the notice of girls at school the possibilities of nursing as a career, and to provide educational facilities for those desiring to follow it. Further, the present system of training fails to some extent to realize that the essentials of nursing are independent of the particular disease being nursed, with the result that a nurse who has trained for one part of the *Register* may be required to duplicate much of her previous training when qualifying for another. The report criticizes the present system of affiliation between certain hospitals whereby a probationer who is partly trained in one hospital has to wait for a vacancy in an affiliated institution, although there are vacancies elsewhere. It is considered that the pre-eminence naturally given to the general hospital has ceased to be justified, since the term "general" no longer connotes the universality of training which it originally did.

Requirements of a Fully Trained Nurse

The essential requirements of a fully trained nurse as set forth in the report are briefly as follows. The nurse must have a sincere desire to serve the sick, have had a good education, and be physically and mentally fit. She must also have a certain knowledge of such subjects as hygiene, anatomy and physiology, the treatment of disease, bacteriology, and dietetics; have practical bedside experience in caring for the sick, and, to add interest to her work and to prevent her from being too mechanical in carrying out her duties, some knowledge of the signs, symptoms, and treatment of disease. To acquire the latter she must have training in the wards of a medical and surgical hospital (general hospital), where she should at the same time be trained in as many as possible of the special departments. The committee also attaches importance to experience in the wards of infectious diseases hospitals and in the care of young children. Apart from the full training to qualify for the certificate of the Central Midwives Board, a definite course in midwifery should not, in the opinion of the committee, form part of the training of the general nurse.

Suggested Training

The following outline of training, which would enable a nurse to complete her full curriculum in about five years, is suggested. The standard set by the Scottish Education Department for teachers of domestic science and physical training should be the standard for the preliminary education of nurses. The arrangement made by the General Nursing Council for Scotland early in 1935, whereby intending nurses could take the theoretical part of the preliminary examination before entering hospital, should be continued. While the subjects could hardly be taught in secondary schools, they might be studied by way of continuation classes, which could be instituted by some of the education committees in larger centres. The subjects necessary for this part of the preliminary examination are elementary anatomy and physiology, hygiene, and dietetics, and although they could be covered in a few months, they ought, in the opinion of the committee, to occupy a full scholastic year, in which subjects such as biology and domestic science might also be studied. The committee recommends that the training given in a general hospital should form the framework of a nurse's training, and to this should be added experience, particularly in nursing

fevers, mental disorders, and sick children. The period suggested for the complete nursing course is five years, which would normally include three years in a general hospital and one in a fever hospital, followed by two courses of six months each out of a selection offered, such as sick children, tuberculosis, mental disorders, orthopaedics, and the chronic sick. The committee recognizes that many practical difficulties would have to be overcome in applying such a scheme over the whole hospital system, but considers that all training hospitals (voluntary and local authority) should be encouraged to take part in this scheme, for which it makes certain recommendations as to finance. The second part of the preliminary examination would naturally be taken at the end of the first year in hospital. The final examination could be taken at the end of each training period, while the subjects were fresh in the candidate's mind, and at the end of the five-years course the examination in the two optional six months' courses could be taken. It is pointed out that up to the present the cost of training nurses has been borne by the hospitals alone, and that any change would lead to an increase in cost. The committee suggests that it would be only equitable that the State should make a contribution towards a training of which the community ultimately reaps the benefit. It is recommended that a special part of the *General Nursing Council Register* should be devoted to the names of nurses who are "fully trained"; this part of the *Register*—the "Central Register"—would take precedence of all the existing parts and would gradually increase in size. Further, a supplementary part of the *Register* should be set aside for tuberculosis nurses. Finally the committee recommends that the Department of Health for Scotland should appoint two additional members to the General Nursing Council; there should be medical representatives nominated by the three Scottish medical corporations and by the Scottish Committee of the British Medical Association respectively.

The report may be obtained from H.M. Stationery Office, 120, George Street, Edinburgh, price 1s. net.

England and Wales

Darlington Health Centre and Maternity Hospital

A new health centre and maternity hospital for the county borough of Darlington has lately been opened in the block of buildings known as "Greenbank," standing in two acres of pleasant grounds in the centre of the town. These buildings were erected fifty years ago as a voluntary general hospital of sixty beds for Darlington and district, and grew by the acquisition of adjacent property. They became vacant with the opening in 1933 of a large modern hospital of 200 beds, erected close to the old buildings as a war memorial. Negotiations then took place between the corporation and the voluntary hospital authorities, as a result of which the corporation acquired the Greenbank property for £16,500 and transformed it into the centre for its public health and maternal and child welfare activities. On the ground floor, in addition to offices for the medical officer of health, the sanitary inspector, and various staff, there is provision for the school medical services, the tuberculosis dispensary, the venereal diseases treatment centre, and clinics for minor ailments, dentistry, artificial sunlight treatment, ante-natal and post-natal work, and psychological and mental treatment. The upper floor is reserved entirely for in-patient maternal and child welfare services, with two theatres or labour wards for "clean" and suspicious cases respectively, ante-natal, private, semi-private, and isolation wards, two other large wards, and a nursery, together with sanitary annexes and sterilizing plant. At present twelve beds are available, but it is expected that eventually the number will be increased to twenty-four. Five outpost maternal and child welfare clinics are maintained to serve outlying parts of the borough, but the advantage of medical team work and equipment will commend the central unit. Darlington suffered for some years from high maternal mortality, and it is hoped that with this extension of services, particularly ante-natal, the much better figures of 1935 will be maintained. Clinic treatment, generally speaking, is free, but charges are made in the maternity wards according to the financial status of the family. By a financial arrangement with the authorities of County Durham and the North Riding, the maternity and child welfare, venereal diseases, and tuberculosis centres are available for patients from those areas. Linked up with Greenbank are the wards and out-patient department of the memorial hospital, the "chronic" wards of a public assistance institution, an infectious diseases hospital, three special schools, a mental deficiency colony, beds in sanatoria, as well as the general practitioners of the district to the number of thirty-five, private midwives, Queen's nurses, and six nursing homes.

The King's Fund Pay-Beds Pamphlet

King Edward's Hospital Fund for London has issued a revised edition of its pamphlet, which gives particulars of the provision made for the professional and middle classes at voluntary hospitals in London. This shows a substantial increase in the number of beds as compared with the accommodation available in 1928, when a special committee of the King's Fund inquired into the subject. The total number is now 1,997 at 108 hospitals. It should be emphasized that the increase in the number of pay-beds is in addition to an extension of the accommodation for patients in the ordinary wards of the hospitals. This pamphlet gives full particulars of the charges at each individual hospital, and further information would always be supplied by the secretary of the hospital concerned. Copies may be obtained from Geo. Barber & Son, Ltd., Furnival Street, E.C.4, price threepence, post free.

Reports of Societies

INTESTINAL STRANGULATION

At a meeting of the Section of Surgery of the Royal Society of Medicine on March 4th, with Mr. SAMPSON HANDLEY in the chair, the subject of discussion was "Intestinal Strangulation."

Mr. IAN AIRD, who opened the discussion in place of Sir David Wilkie, and said that his ideas derived largely from Sir David's inspiration, referred first to the continuing high mortality—about 40 per cent.—following operation in cases of acute intestinal obstruction. Such mortality, which had altered little since the close of the last century, placed an urgent responsibility on the abdominal surgeon. The operative treatment of various causes of strangulation was well standardized. The only open question at present was whether all strangulated but still viable loops should be returned to the abdomen or excised. Where was the dividing line which separated devitalized bowel requiring resection from viable bowel? In the past there had been a tendency to take colour, sheen, absence of smell, presence of peristalsis, and mesenteric pulsation as criteria of viability. He intended to present experimental findings which challenged the desirability of returning to the abdomen all strangulated loops which upon release of strangulation appeared to retain their viability. He had studied the effect of a sudden relief of congestion of the bowel in a series of dogs and cats, and the results strongly suggested a depressor effect on the blood pressure. While release of early venous congestion of the bowel might be beneficial, release of long-maintained congestion, even though the bowel during this period of cyanosis had remained apparently viable, was not without danger. Some support was thus lent to the recent practice of resecting seriously obstructed and strangulated loops even in the absence of frank gangrene.

Cause of Death in Strangulation

Turning to considerations of general treatment or the combating of the general toxaemia accompanying intestinal strangulation, Mr. Aird said that the cause of death

in strangulation must first be established. Strangulation of very short loops, as with an obstructed appendix, gave death from perforation and peritonitis—for example, reduced non-viable Richter's hernia. The strangulation of very long loops—half or more of the small intestine—presented a different problem. In these conditions death was due to loss of blood from the circulation into the vessels of the strangulated loop. This pointed to the importance of blood transfusion, which would prevent immediate death from shock.

In the strangulation of loops of medium length—the common clinical form—the loss of blood was again considerable, and transfusion must once more be of benefit. But transfusion alone in these strangulated loops would not prevent death. Death was due to absorption by the peritoneal surfaces of transudate from the strangulated bowel which, as a result of bacterial growth in the bowel wall, contained two toxic elements—namely, a euglobulin, perhaps related to the complex bacterial toxins, and a diffusible substance, perhaps histamine, which was present in surprisingly high concentration.

Chemical Nature of Toxins

Mr. Aird described investigations into the toxic qualities of this transudate from strangulated loops with its protein and non-protein elements. In the first place the relation of the toxaemia of intestinal strangulation to bacteria had to be considered. That strangulation of sterile intestine had no toxaemic factor was capable of easy proof. The question then arose whether, after strangulation, bacteria were necessarily present in the toxic peritoneal exudate. As a result of a series of experiments on cats he concluded that the toxic peritoneal transudate in medium length strangulated loops had an origin in bacteria which invaded the anoxaemic devitalized tissue of the bowel wall.

Further, an attempt had been made to arrive at some idea of the chemical nature of the toxins in the peritoneal transudate. A simple protein separation was performed in the first instance, and the protein fractions tested for toxicity by guinea-pig injection. The only toxic protein fraction was shown to be euglobulin. The second toxic element was non-protein, diffusible, and shown to cause death in young guinea-pigs by respiratory embarrassment. This immediately suggested the presence of histamine. This work was still incomplete, but animal experiments so far undertaken suggested that histamine might be the diffusible factor in toxic peritoneal transudate from strangulated loops.

The Fluid Loss Factor

Mr. DAVID SLOME described certain experimental observations forming part of a series carried out by Mr. G. C. Knight and himself, and he left it to Mr. Knight to discuss the significance of the experiments. One principal point of investigation was the fluid loss factor in the case of long loop strangulation. In these experiments the local fluid loss was shown to be in no sense adequate to account for the death of the animal, even in the case of long loops. An initial fall in pressure could be accounted for by the fluid loss, but with such fluid loss one would expect, on release, a recovery of blood pressure, though to a rather lower level than the original, but instead of this there was a continued decline in blood pressure leading to the death of the animal. The fluid loss was then investigated more carefully. It was found possible by cross-circulation to supply the intestine of one animal with blood from a second, but strangulation still produced collapse in the first animal despite the fact that the fluid loss was being sustained by the second. A comparable fluid loss in man—4 per cent. of body weight—would represent at least 2¼ litres of fluid, and this together with the portion of intestine involved and its gaseous content would mean that a strangulated external hernia would need to be at the very least the size of an Association football before it could be considered adequate on theoretical grounds to cause death. Clinically such cases must be of the very greatest rarity. The conclusion was that although the local fluid loss was a factor of importance and must be considered in treatment, it could not, except in the very rarest cases, be regarded as the sole agent in the production of collapse in intestinal strangulation.

On extending the investigation from long loops to medium-sized loops there appeared to be no constant relation between the amount of fluid loss and the survival time. In no case in the series was the volume of fluid loss adequate to account *per se* for the death of the animal. The time of appearance of the toxic substance in the peritoneal fluid was governed by the severity of the strangulation. In severe strangulation the toxin might be present in the peritoneal fluid after one hour; in mild strangulation it was not present after twenty-four hours. The presence of a depressor substance in the venous blood had been demonstrated one hour after strangulation. This depressor substance was readily dialysable through the semi-permeable membrane. By experiment it was shown that the depressor substance in each case arose as a direct result of the strangulation. The toxin was demonstrable in the venous blood draining the strangulated loop. In order to determine whether the depressor substance was produced by the tissue of the gut wall or was merely a product already present in the lumen which was absorbed under the new conditions, another experiment was instituted the result of which was to show that the depressor substance arose in the wall of the gut and passed into the lumen and into the venous blood. As this depressor substance was not present in the lumen before strangulation, and as the rapidity of its formation in high concentration was against a bacterial origin, it seemed as if it must arise from changes in the gut wall. In five human cases of strangulation a depressor substance was demonstrable in the urine similar to that found in the experimental animals.

The Depressor Substance

Mr. G. C. KNIGHT said that Mr. Slome had shown that within an hour of the onset of strangulation a depressor substance might accumulate in the peritoneal fluid. The first postulate for any lethal factor—namely, potential rapidity of action—was thus fulfilled. The substance was not bacterial, and it corresponded closely to the substances obtained by physiological extraction from the tissues of the gut wall. It was not believed that it was one substance, but rather that it was a mixture of several of the depressor substances occurring in extracts of tissue. At the same time, it was possible that the toxaemia observed in strangulation might be contributed to in the later stages by bacterial action, though if this was so the role of *B. welchii* in this respect seemed rather dubious, because it had been shown that in a loop of strangulated gut after twenty-four hours the *B. welchii* present were of a relatively avirulent strain. In strangulation death certainly could not be attributed to a fall in blood chlorides and probably not to any action on the part of *B. welchii*. It appeared that fluid loss, although it had a role, was only an accessory in the circulatory collapse of strangulation. The results showed that the severity of the strangulation appeared to be the determining factor in relation to survival time, and this accorded with clinical experience. There was admittedly a close correspondence between the length of loop affected and survival period, but there seemed to be no justification for separating cases into three different classes according to whether the loop was very short, very long, or of medium length. When longer loops were affected, of course, the fluid loss played a more important part, but with a longer loop there was necessarily a larger area for the production of toxic substances.

What was the significance of the release into the circulation of the depressor substance which was dammed up in the veins and lymphatics of the strangulated loop? In mild cases, with the patient in good condition and the peritoneal fluid non-toxic, the substance let into the circulation appeared to be well tolerated, but in severe cases the release into the circulation of a large dose of toxic substance, which had a characteristic action on the blood

pressure, had a fatal outcome. Another question was whether, in considering operation, attention should be fixed on the viability of the patient rather than the viability of the gut. Experimentally, strangulated loops of equal severity had been prepared and operated on at twenty-four hours, and in the animals in which simple relief was given by division of the ligatures death had resulted within ninety-six hours of the original strangulation, whereas animals in which excision was performed remained alive and well. It would be most interesting to compare results of the two procedures in human cases of equal severity. Alternatively, there remained the hope that it would be possible to produce an antibody or some method of combating the toxic substance which it was believed had a definite significance in causing death in strangulation.

Function of Upper Part of Intestine

Mr. R. ST. LEGER BROCKMAN said that students were taught that in all cases of intestinal obstruction there was interference with blood supply, and it was only a matter of degree whether it was an actual twist of the bowel or a slight congestion of the bowel above an obstruction. As he saw it, however, even with the strangulated loop there was an intestinal obstruction above it, so that really what had to be dealt with was the fundamental question of the toxaemia of intestinal obstruction, whether there was in the gross sense of the term a strangulation or not. The duodenal area was more or less aseptic, and the lower part of the small bowel was filled with organisms. What part did the organisms play in the production of the toxic substance? It was stated that bacterial origin had very little to do with it. His own view was that the toxic substance must be excreted into the bowel and taken up there by the blood stream. In the normal peristaltic action of the bowel there was a stimulus and a discharge of energy. In intestinal obstruction such stimulus and discharge took place in excess, and the product of the energy was accumulated in the form of an ever-increasing amount of chemical metabolites. In other words, what really happened was that the cells in the intestine were living in their own excrement, and no cell could go on living unless the excreta were removed. This portion of the bowel could not get rid of its own excreta, and as these products mounted up the bowel they stopped the function of the glands in the upper part of the intestine—namely, the liver and the pancreas.

A common clinical experience in cases of strangulation and ordinary obstruction was that after an operation for relief the patient did well the next day, but afterwards something happened suddenly, the pulse went up, the temperature dropped, and the patient died within two or three hours. It looked very much as if something vital had given way, as if something necessary to life had stopped. He could not help thinking that what was happening in these cases was a gradual stoppage of the function of the cells of the gut until it reached the level of the duodenum, when the other glands, the liver and pancreas, stopped working, and death took place. There was some more significant function in the upper part of the intestine than was often supposed, possibly some formation of vital ferments in the duodenal part of the gut which were necessary for the life of the whole organism.

Combination of Factors

Mr. R. L. HOLT said that some years ago he carried out a series of experiments on intestinal strangulation, and the results described that evening confirmed in large measure that earlier work. He agreed entirely with Mr. Aird that there were two toxic factors. The first appeared within the first hour, and he was perfectly certain that it was an entirely different substance from the one which followed later after twenty hours. This first substance might not be histamine, but it was something very similar. The substance was not peculiar to the intestine. He had found that he could obtain the same substance when he strangulated a piece of omentum. He believed it was produced as a result of strangulation in most tissues of the body, and might be the result of tissue breakdown from anoxaemia. Later there appeared another substance which might or might not be euglobulin. It appeared with an alteration of the fluid from the strangulated loop, when it became black and had a characteristic odour as occurring in the presence of gangrenous gut.

But Mr. Holt thought it would be unfortunate if the impression were given in the present discussion that the toxic factor was of overwhelming importance in acute strangulation. Mr. Brockman had pointed out very truly that strangulation was always associated with an obstruction in the proximal part of the intestine, and clinically that was important. The commonest type they had to deal with was an external hernia, where the loop of the intestine was so small that it was doubtful whether its effect on the organism was at all considerable. In addition there was the effect of dehydration from vomiting and the results which followed distension. The most important factor which resulted from distension of the small intestine was the amount of fluid withheld by the obstruction. He agreed, however, that the toxic factor produced had an important bearing on the case ; when he looked over his experimental work he was convinced that fluid loss was not the sole factor. The combination of fluid loss plus the absorption from the peritoneal cavity of the preliminary toxin, supposedly histamine, was sufficient to kill the patient if a long loop was involved. In the cases where very short loops were involved death did not come about unless there was perforation. As regards treatment he thought definitely that every loop as to the viability of which there was the slightest doubt should be resected, and in very bad cases where the patient was unable to stand a great deal of manipulation what the Americans called " exteriorization " of the loop was a very good treatment.

The discussion was concluded with a few comments by Mr. TURNER WARWICK, who suggested that there might be some chemical change, not only in the loop itself, but in the very much constricted and contracted portion of the lower intestine, and that the changes below the obstruction were no less marked than the changes above, and had not received the attention which they deserved. Mr. IAN AIRD, in replying to the discussion, mentioned that experimentally it was possible to differentiate between strangulation and simple obstruction in a way that could not be done clinically, and a strangulated loop could be studied so easily in the experimental animal that in his experience the secondary factor of complicating distension had been excluded.

FRACTURES NEAR THE SHOULDER-JOINT

At a meeting of the Section of Orthopaedics of the Royal Society of Medicine on March 3rd, with Mr. C. MAX PAGE in the chair, a discussion took place on the treatment of fractures in the region of the shoulder-joint.

Treatment of Bone and Soft Parts

Mr. GEORGE PERKINS said that the conception of a fracture as a dual injury was not new ; nevertheless in the past there had been those who had concentrated on the treatment of the soft parts to such an extent that they had overlooked the bone altogether, while others—the majority—had treated the bone and forgotten the soft parts. There was now a modern school of thought which laid emphasis on the fact that, a fracture being a dual injury, bone and soft parts both required treatment, and the treatment of both was equally important, and ordinarily should be undertaken simultaneously. In the old method of treatment the bone was first attended to, immediately by reduction, followed by splintage until union, and then by protection until consolidation, and only when the repair of the bone was complete was the repair of the soft parts started. The masseuse was called in, and had to do her herculean task of freeing the muscles which were bound together by scar tissue, strengthening flabby muscles, stretching shortened muscles, loosening stiff joints, and restoring control of

the circulation. He exhibited what he suggested was a more rational schedule of treatment.

Bone	*Soft Parts*
I. Reduction	
II. Splintage until union ...	Making the patient: 1. Move all free joints through full range. 2. Contract all muscles of immobilized joints. 3. Use the limb.
III. Protection until consolidation	Making the patient: 1. Move the joints through full range. 2. Use the limb. 3. Possibly massage.
Repair of bone complete ...	Repair of soft parts almost complete: Possibly manipulation under N_2O to regain complete range of movement of the joints.

Granted that a fracture was a dual injury, and that the bone and the soft parts had to be treated more or less according to this schedule, he considered the relative importance of the two treatments. First of all, bony union was essential, and where it was difficult to get union of bone the treatment of the bone was paramount. For example, in fracture of the scaphoid it might be necessary to immobilize the wrist-joint for six months in order to get union. But where there was no difficulty in getting union of bone and might be difficulty in restoring mobility to a joint, the treatment of the soft parts might become of greater importance than the treatment of the bone. The shoulder and the knee had this in common, that when they were immobilized for only a short time they stiffened. This happened even when there had been no injury or inflammation around the joint. It was still more so when there was an injury at or near the joint, and particularly was this the case with the shoulder. One dare not immobilize a damaged shoulder-joint for any length of time.

Shoulder-Joint Fractures

Mr. Perkins's first contention, then, was that in fracture about the shoulder-joint the treatment of the soft parts was of far greater importance than the treatment of the bone—even allowing that the bone needed treatment. But did it? The treatment of bone might be divided into three phases: reduction, splintage until union, and protection until consolidation. The anatomical repositioning of the fragments was rarely possible and rarely necessary. Good reduction—by which he meant that when union was completed the alignment of the bone would give rise to no loss of function—was sufficient. But he maintained that in fractures round about the shoulder-joint reduction had very rarely to be attempted for the reason that the fractured surfaces were already in good alignment, and in the cases where reduction should be attempted he submitted that it was almost impossible without open operation.

Coming to splintage, this was used for two quite separate reasons: to prevent fractured ends from moving on one another, and to hold the fractured ends in good position. If there were muscles inserted into both fragments these muscles themselves were sufficient to keep the fractured ends still. An excellent example was the fractured rib, where the muscles kept the fractured ends still and prevented them shifting on one another. If there were no muscles attaching to one fragment, as in a transcervical fracture of the femur, or if there were muscles attached to both fragments, as in fractured scaphoid, recourse to splintage was necessary to hold the fragments still. In the case of the shoulder-joint a plexus of muscles was inserted in the neighbourhood of the fracture; he submitted that those muscles were quite sufficient to hold the fractured ends immobilized, and it was not necessary to use splintage in a fracture around the head of the humerus in order to keep the fractured ends still. As for the second reason for the use of splintage—namely, to hold the fragments in good position—he instanced the case of a fracture of the middle of the shaft of the femur. They would all agree that the two essentials in any splint that was used for such a fracture were a longitudinal pull to reduce overlap, and, supposing the patient recumbent, an upward pull to prevent the backward sag. But unless plaster-of-Paris were used as the method of splintage the splint employed would not prevent the fractured ends from moving on one another; it would only keep the ends in good alignment. Supposing one was dealing with a fracture which lay between two hinged joints such as the knee and the ankle, good alignment was essential, because if there were bad alignment the plane of the knee-joint and of the ankle-joint would not afterwards be parallel. If, however, the fracture lay between a ball-and-socket joint and a hinged joint, he maintained that malalignment was of little moment, because the plane of the ball-and-socket joint would accommodate itself to the plane of the hinged joint; the shoulder-joint was such a ball-and-socket joint, and therefore he submitted that the second reason for using splintage in fractures about the shoulder-joint did not hold.

Splinting Unnecessary

Quite apart from the two reasons for using splintage, laymen, and sometimes doctors, thought that the splint was also used for a third reason—to help the bone to unite. That was not true, or was true only on very few occasions. Most fractures would unite, whether treated with a splint or not, and fractures in the region of the shoulder-joint belonged always to this major group, and non-union was never seen. Mr. Perkins contended, therefore, that a fracture about the shoulder-joint should never be splinted; that reduction was often unnecessary, and if it was necessary it was usually impossible without open operation; that splintage was unnecessary to hold fragments immobilized, the muscles sufficing for this purpose; that splintage was also unnecessary to hold the fragments in good position, because malunion was of minor importance considering that the shoulder-joint was a ball-and-socket joint; and, finally, that the treatment of the soft parts was much more important than the treatment of the bone. The bugbear to be avoided was a stiff, painful shoulder. He thought that treatment by massage should be commenced forthwith. Massage should be given with the patient in the recumbent position, and after some very gentle passive movements at first, active movements to the shoulder should be instituted and voluntary action of the muscles started by the masseuse. If, after two or three days, the patient showed no sign of voluntary control, either from laziness, pain, or paresis, he should be taken into the hospital or nursing home, put to bed, and treatment by massage intensified.

Cases at Liverpool Fracture Clinic

Mr. R. WATSON JONES of the Liverpool Royal Infirmary Fracture Clinic said that the newborn child ran a considerable risk of sustaining a fracture of the shaft of the humerus, but little or no risk of injury to the shoulder-joint. During childhood and adolescence the elbow was susceptible, but the shoulder retained its immunity, and not until adult life did the shoulder become really vulnerable. He analysed 571 cases of injuries of the upper end of the humerus treated at his clinic over a five-year period. They consisted of:

Fracture of the great tuberosity	79
Dislocation of shoulder-joint	216
Fracture of neck of humerus	261
Fracture and dislocation of shoulder	15

Dislocations of the shoulder-joint and dislocation with fracture of the great tuberosity should be grouped together because clinically they were similar injuries. The uncomplicated dislocation of the shoulder presented no difficulty in diagnosis or treatment. He emphasized that early forced passive movement of the shoulder was just as disastrous as similar movement of the elbow. Myositis ossificans was quite often seen in badly treated shoulder dislocations. When the great tuberosity had been torn off the treatment differed very little from the

uncomplicated case. The fragment was usually a large one, and it was found to be completely reduced when the dislocation itself was reduced. The combined injury had a somewhat longer incapacity period. In 143 uncomplicated dislocations the average incapacity period was between one and two months; in sixty-two cases of combined injury it was from three to six months.

The incidence of nerve injury in dislocations of the shoulder was about one in seven cases, as shown by the following table:

	Cases	Paralysis
Dislocation without fracture	154	21
With fracture of great tuberosity ...	62	9
With fracture of neck of humerus ...	15	3

The circumflex nerve was most commonly involved (in seventeen cases), the posterior cord in eight, the musculospiral in four, the outer cord in two, and the inner cord in two. Fractures of the neck of the humerus fell into three distinct groups, each with its characteristic mechanism:

Produced by direct contusion ...	Adults 43 cases.
Adduction type	Adults 56, children 65 cases.
Abduction type	Adults 89, children 6 cases.

Fractures of the neck of the humerus in children were almost always of the adduction type, a curious fact of which he had no explanation.

Mr. C. H. S. FRANKAU protested against the suggestion by Mr. Perkins that fractures of the neck of the humerus with displacement required operation. He himself used to think so until about six years ago, when he discovered that by strong traction, first in the long axis of the humerus and then in full abduction, one could get the fragments into perfectly good position. He was glad to see that the treatment advocated by Lucas-Championnière of early mobilization and active movement was apparently coming back again.

Mobilization in Fracture Treatment

Mr. H. A. T. FAIRBANK was pleased that both Mr. Perkins and Mr. Jones had emphasized the disadvantages of abducting the majority of these fractures. He had often seen cases that had been made infinitely worse by abduction. Displacement of the great tuberosity was unimportant. From the *x*-ray picture one would imagine it to be a great inconvenience and to cause limitation; as a rule it was nothing of the kind. Mr. BLUNDELL BANKART mentioned the value of complete movements in the treatment of fracture of the neck of the humerus. Mr. ALAN TODD said that a certain amount of criticism had been directed against the treatment of some of these fractures by abduction. The treatment, of course, needed to be applied, as did other methods, with common sense. The cardinal principle that would apply to the majority of fractures in the region of the shoulder-joint would be that of placing the greater fragment which was controllable in line with the lesser fragment which was not, and if the result of abduction was to produce an obvious malunion then abduction would be inappropriate. Many fractures were treated as though abduction were a universal method, and the results were deplorable, but that was no argument against it in appropriate cases. Mr. WATSON JONES thought it might be over-enthusiastic to suggest that with these fractures mobilization should be started on the first day. He would say that mobilization of the shoulder in these fractures without displacement should begin in two or three weeks; he thought harm could be done by mobilizing them too soon. On the other hand, mobilization of the fingers, wrist, and elbow—the undamaged joints—must begin at once. The patient with the stiffest shoulder was the one who had stiff fingers. The urgent and imperative thing was that there should be no stiffening of the distal joints.

After some further discussion, Mr. GEORGE PERKINS said that he thought injuries of the soft parts could very well take care of themselves, and that the patient, if allowed and encouraged to move his damaged part himself, would not move it too early, and would not, therefore, increase the damage that had been done by the injury. Mr. Watson Jones had suggested that voluntary movements of the shoulder should not be encouraged during the first few days after injury. He was in an entirely different camp. He thought that movement ought to be encouraged as soon as possible, and he believed that much quicker results were obtained in that way than if it were assumed that the damaged parts required rest for several days or a week or two before they were allowed to be moved.

TYPHUS-LIKE FEVERS OF MALAYA

At a meeting of the Society of Tropical Medicine held on February 20th, with the president, Sir ARTHUR BAGSHAWE, in the chair, Dr. R. LEWTHWAITE and Dr. S. R. SAVOOR presented a paper entitled "Recent Work on the Typhus-like Fevers of Malaya."

Dr. Lewthwaite said that these endemic fevers were three in number: rural typhus, urban typhus, and tsutsugamushi disease. Attempts to maintain strains of the viruses of rural typhus and tsutsugamushi in laboratory animals had been frustrated by the insusceptibility of the guinea-pig, rat, and rabbit; nor had it been possible to obtain a strain of urban typhus. In 1931 Nagayo's method of intraocular inoculation of virus into rabbits was tried, and proved successful in rural typhus and tsutsugamushi. The injection of virus caused an acute iridocyclitis. The reaction subsided and left the rabbit healthy and immune. A positive Weil-Felix reaction (XK in type) developed. In scrapings made from the endothelium covering Descemet's membrane in the reacting eye, and stained by Giemsa, intracellular ricketssia were plentiful; they appeared to be identical with the *Ricketssia orientalis* of Nagayo. By intraocular passage of infected aqueous humour strains might be maintained indefinitely. In the case of urban typhus it was found that guinea-pigs injected intraperitoneally with virus developed fever and a scrotal reaction; a strain had been maintained for over three years. Ricketssia, indistinguishable from *Ricketssia prowazeki* but distinguishable from *Ricketssia orientalis*, were found in the exudate that covered the tunica vaginalis and parietalis. By the intraocular inoculation of rabbits strains could not be maintained beyond the third generation.

Intradermal Inoculation

In the white rat infections with the urban and rural viruses were inapparent. In the monkey intradermal inoculations of the virus of rural typhus and tsutsugamushi had given identical results—namely, fever, leucopenia, a positive Weil-Felix reaction (XK in type), and, at the site of inoculation, a papule that usually progressed to form the necrotic ulcer characteristic of tsutsugamushi in man. Intradermal inoculation of the virus of urban typhus had given fever and leucopenia, a positive Weil-Felix reaction (X19 in type), but no ulcer. Experiments had shown that between strains of rural typhus and tsutsugamushi complete cross-immunity existed. No distinction between the viruses of these two diseases could be demonstrated by any laboratory test; and it was doubtful whether the two diseases should continue to be regarded as separate entities. Between strains of rural typhus and tsutsugamushi on the one hand, and urban typhus on the other, there was no cross-immunity. Similarly, comparison of strains of rural typhus and tsutsugamushi with Rocky Mountain spotted fever had shown absence of cross-immunity. A batch of Rocky Mountain spotted fever vaccine, known to be efficacious against spotted fever and the typhus of São Paulo, had no protective value against the experimental forms of the Malayan typhus fevers.

Xenopsylla Cheopis

It had been demonstrated in each of two series of experiments that under laboratory conditions the rat flea, *Xenopsylla cheopis*, could acquire a virulent infection with the virus of urban typhus from infected white rats by feeding, and that on transference to uninfected white rats it transmitted the infection to them. Further, it had been demonstrated that faeces from infected fleas, when

rubbed on to the scarified abdomen of a guinea-pig, transmitted the infection. Parallel experiments, carried out *pari passu* with the above transmission experiments, in which the virus used was that of rural typhus, had failed to effect transmission. Attempted vaccination of guinea-pigs against experimental infection with rural typhus, by use of a formalized emulsion of brain tissue virus, based on a successful method reported in the case of typhus exanthematicus, had proved unsuccessful. In the case of both rural and urban typhus it had been shown that convalescent serum from animals or man had no significant protective value against experimental infection.

Discussion

In opening the discussion Dr. FELIX said that the "typhus group of fevers" was now firmly established both in and outside the Tropics, and the present paper was a valuable contribution to knowledge because it reinforced the experimental basis on which the present conception of the virus group rested. With regard to vaccination experiments, Dr. Lewthwaite had been using formalized brain tissue, and with this he had obtained negative results. There was, however, a marked difference in the immunizing effect of killed tissue virus and killed louse virus. The latter was an efficient immunizing agent, the former was not.

Dr. WILLIAM FLETCHER pointed out that when he first went to Malaya at the beginning of 1903 patients with typhus were not seen, then suddenly they began to appear. This was not because they were missed previously, but because they were not there. Colonel POOLE outlined Boyd's classification for typhus in India. The cases were grouped according to their serological reaction with *Bacillus proteus* XK, X2, and X19, their regional distribution, and clinical type.

Colonel SHORTT said that nearly all the cases of typhus he had seen in India fell into two groups: those occurring in the cold weather in the plains, and those in the hot months all contracted in the hills. The vector or vectors were evidently insects which liked conditions neither too hot nor too cold. The disease had only appeared at Kasauli during the last six or seven years. Grey squirrels had been introduced there from Madras, and serological evidence suggested that they might be the vector.

Dr. LÉPINE (of the Pasteur Institute, Paris) said with regard to typhus fevers that in French Indo-China the situation was almost the same as in the Malay States. Dr. Lewthwaite had referred to the difficulty of securing infected blood from typhus patients. The reason for this was that the blood was only infective during the first five days, and by this time the diagnosis had not generally been made, as the Weil-Felix reaction only became positive later. There was a method now available of getting infected blood at any time or at any stage of the disease. The reason blood was not infective after the fifth day was not because the virus was absent, but because after that time antibodies appeared in the blood. If, however, 5 c.cm. of blood were collected at any time, separated, and the clot washed and injected intraperitoneally into the guinea-pig after grinding it up, the virus could be recovered from the inoculated animal; this held true for the disease in guinea-pigs as well as in man.

Sir JOHN MEGAW emphasized that tsutsugamushi disease and rural typhus could not be differentiated by the presence or absence of an initial ulcer or bubo. In a patient with tick typhus in India he had actually observed a local ulcer and bubo with the tick still attached, yet in the majority of cases in India no local ulcer or bubo was found.

In reply, Dr. LEWTHWAITE said he had not taken Nicolle's criterion as a cast-iron criterion, but they knew from the work of Anigstein and from other sources that the virus was almost certainly rat-borne. The opinion of the Institute of Medical Research was that they would get no further with formalized tissue vaccine. He thanked Dr. Lépine for his suggestion concerning the recovery of virus from the blood of typhus patients in the later stages of the disease.

TREATMENT OF TETANUS

At a meeting of the Section of Medicine of the Royal Academy of Medicine in Ireland on February 7th, with the president, Dr. V. M. SYNGE, in the chair, Dr. E. T. FREEMAN read a note on the treatment of tetanus, basing his observations on five cases which had come under his care during the previous six months. He pointed out the well-known facts that the gravity of the disease varied directly with the shortness of the incubation period, and that the three main causes of death were: (1) exhaustion and cardiac failure in severe cases, with starvation as a possible factor; (2) asphyxia from spasm of the respiratory muscles and glottis; and (3) bronchopneumonia in protracted cases. Five cases of tetanus, four with short incubation periods, were described. Of these five patients, four recovered and one died. The death was due to circulatory failure, but was directly attributable to bronchopneumonia.

Serum Therapy

Serum was given freely intravenously and intramuscularly. The dosage was from 160,000 to 200,000 units in each case. Intrathecal serum was not advised. It was not only needlessly troublesome to administer, but was actually harmful owing to the aseptic meningitis which the foreign protein produced. Morphine was not used for the relief of pain or convulsions, nor was chloroform employed for the latter purpose; chloral hydrate was used partly in one case; luminal, especially luminal sodium, was employed in all the cases with excellent results.

In the third case avertin was tried with remarkable sedative effect. In the fourth and most convulsive case avertin was employed night and morning for thirteen days, producing almost continuous anaesthesia. The dose given was midway between the total anaesthetic dose and the obstetric dose for the patient's weight. This patient received in all 99.7 c.cm. of the drug. In the fifth case it was employed at night for twelve nights.

The conclusions Dr. Freeman reached were that luminal was of very great value and much superior in tetanus to the older hypnotics. Avertin appeared to be a drug of inestimable value. For the patient it stopped the spasm and relaxed the rigidity, and substituted sleep and rest for the most intense agony of body and anxiety of mind. For the nursing staff it reduced to a minimum the strain and effort of dealing with these very difficult cases.

Discussion

The PRESIDENT said that he was glad to notice that Dr. Freeman stressed the avoidance of intrathecal medication, in spite of the fact that it was mentioned in all the textbooks; he personally did not regard it as efficacious.

Dr. H. L. PARKER said that he agreed with all the forms of treatment that Dr. Freeman had recommended. Intrathecal injection he regarded as useless. It produced a sterile meningitis, irritated the patient, and did not achieve its purpose. He gave a large amount of antitoxin intravenously, up to about 100,000 units. He then gave avertin and opened the wound. He tried to keep the patient under either amytal or avertin. Sometimes in severe cases, in spite of keeping the patient flooded with antitoxin and under avertin, and therefore quiet, the temperature continued to rise, and death occurred even though no spasm at all took place. This sometimes occurred even under what appeared to be the most favourable conditions.

Dr. J. C. FLOOD did not think that the wound should be incised or freely opened. He thought the tendency nowadays was to leave the wound alone. Major F. R. W. ALLEN said that in Bombay they had found the intracisternal method of giving antitoxin produced very much better results than any other method. He personally had never had a case in which recovery had taken place until he had begun to use the intracisternal route. As well as the antitoxin, patients were given the maximum dose of chloral hydrate and a 25 per cent. solution of magnesium sulphate intramuscularly.

CORRESPONDENCE

Radiological Examination of Stomach and Duodenum

SIR,—The contribution of Dr. Stuart Cross and your leading article in the *Journal* of February 22nd are well worth the consideration of clinicians, radiologists, and others. Dr. Cross's able plea for collaboration between the "physician" and the radiologist has been stated so often that one would imagine the principle agreed upon, yet in practice how frequently overlooked.

Many important points are raised and their significance discussed in that communication, but these remarks will be confined to the problem of the duodenal cap. It is no doubt true that the radiological diagnosis of duodenal ulcer has been made more often on the constant deformity of the cap than by the demonstration of a crater. In many of these cases it appears to be impossible to show a crater, and it then seems reasonable, if the deformed cap is tender to palpation and symptoms suggesting duodenal ulcer are present, for the radiologist to report that ulceration is probably present—either recurrence of the old ulcer or a fresh one. Again, when the symptoms have passed and there is no palpable tenderness at the deformed cap, it seems logical to say that the ulcer has probably healed. This may not be ideal, but it covers the imputation that radiologists report the cap deformity to be due at one time to ulceration and at another time to cicatrization of a healed ulcer.

As to the intrinsic peristalsis of the cap, Dr. Cross states that normally there seems to be little or none, and admittedly the cap does appear at times to remain more or less filled and passive. It may be seen, however, to contract and expel its contents quite independently of the gastric peristalsis, or, in cases where the cap is elongated, a peristaltic wave may even be seen to start from its base and pass onwards. It would be unusual, it is thought, though by no means impossible, that this inch or so of the alimentary tract should be devoid, or nearly so, of peristalsis, while the adjacent stomach and the rest of the duodenum both show active peristalsis. Dr. Cross's conception of jets that spurt through the pylorus is also one of opinion. My impression is rather a more gradual flooding of the cap by the gastric peristalsis.

The contribution of Dr. Stuart Cross is a valuable one, and offers fresh ideas and suggestions in a field where technique tends to become more elaborate and interpretation, at times, still difficult.—I am, etc.,

London, W.1, March 2nd. R. W. A. SALMOND.

X Rays in Intestinal Obstruction

SIR,—I was interested in the excellent article on "*X*-Ray Diagnosis of Acute Intestinal Obstruction" appearing in your issue of December 21st, 1935 (p. 1197). In the *Medical Journal of Australia* (August 1st, 1931) I published an account of a type of very slowly progressing obstruction of the small bowel, and suggested as a short cut to diagnosis the use of a barium meal. A senior colleague objected to this method on the grounds that the mass of barium might make the obstruction worse. The suggestion was then made that a plain film might be of value. Subsequent experience showed that it was of great value, and the examination has now become a routine at the Launceston Public Hospital in cases where the diagnosis of intestinal obstruction is possible but not certain. The research of Patey and Ascroft into the type of picture found in different parts of the bowel will be of great value in the interpretation of difficult films.

My main object in writing this letter, however, is to point out that in a certain type of case the plain *x*-ray may give a negative result even in the presence of obstruction, but that in these circumstances the possibilities of *x*-ray diagnosis are still not exhausted. I published the details of such a case in the *Medical Journal of Australia* (October 27th, 1934). Symptoms suggesting obstruction had been present for several days. A plain skiagram was taken, but no gas was seen. The diagnosis of obstruction was still in doubt. A glassful of a thin suspension of barium was then given, very slowly, over a period of half an hour. Films were taken two hours and four hours later, and the second film showed distended coils of small bowel. At operation the ileum was found obstructed by an enormous gall-stone. The interesting point was that there was no gas in the small intestine above the obstruction, thus explaining the failure of the plain film to show obstruction. I have never seen a similar case to this, but can imagine that in certain other types of obstruction—for example, that due to a kink—the obstruction might be intermittent and gas absent. For this reason it is wise, if there is reasonable doubt and if time allows, to go on to the barium emulsion technique when the plain film is negative. The emulsion is made very thin, and is swallowed in sips. Films are taken at intervals of two, four, and six hours.

Recently I had to deal with a case where I could not distinguish between gall-bladder colic and intestinal obstruction. As the radiologist was not available for four hours I gave a glass of barium emulsion. The patient apparently vomited it all up. Nevertheless, when the film was taken four hours later some had passed right through to the colon, and the barium showed up coils of non-distended small intestine, thus clearly demonstrating that there could be no obstruction of the lower bowel. As two routine enemata had produced neither faeces nor flatus the value of the special examination could hardly be exaggerated.—I am, etc.,

Launceston, Tasmania, Feb. 8th. C. CRAIG.

Therapeutic Action of Anti-typhoid Serum

SIR,—I have been away from home lately for several days, and only a day or two ago read Dr. Petrie's letter in the *Journal* of February 29th (p. 443). I fear that I did not make myself clear on one point when I spoke in the discussion to which he refers. In contrasting the results of the serum treatment in mice and men I had in mind (though to the best of my recollection I did not put my thoughts into words) the difference between the diseases treated in each case. In the experimental mouse the animal suffers from an illness produced by the injection (subcutaneous or intravenous) of a single toxin or of bacteria of one sort; in man the patient is the subject of an intestinal ulceration, often severe, which is the focus of the toxaemia or septicaemia.

This intestinal ulceration may also be the source of infection with other organisms than those of typhoid, so that not infrequently a mixed infection is the result. Possibly this explains why it is that no effects were observed in 60 per cent. of the Cairo and Jaffa cases. I was careful to say in the discussion that I accepted without hesitation Dr. Felix's statements concerning his experiments and the preparation of the remedial serum.

As regards the action of the specific serum, one of my difficulties is this—that I have seen exactly the same beneficial results follow the subcutaneous injection of typhoid endotoxin, of typhoid bacilli (vaccines), and of antitoxic serum.—I am, etc.,

London, N.W.6, March 9th. E. W. GOODALL.

Supracondylar Fracture of the Humerus

SIR,—With reference to the immediate treatment of the closed supracondylar (transcondylar) fracture of the humerus, I agree with Mr. Fairbank (*Journal*, March 7th, p. 501) that the stretching of the lower arm from a gross displacement of the bone fragments creates a constant danger to the circulation, but to immobilize the arm with the elbow flexed beyond a right angle in the presence of much swelling is, to my mind, an equal danger. On two occasions I have seen gangrene of the fingers (on one occasion of the hand as well) follow this injury ; in one case there was severe displacement of the upper bone fragment, and an improvement in the circulation was being waited for ; in the other, after reduction, the elbow had been fixed in acute flexion in the presence of considerable effusion.

Gross displacement of the bone fragments should, in my opinion, be immediately reduced, and the arm should be immobilized with a right angle of flexion at the elbow. If this has the desired effect of improving an impeded circulation a further manipulation to gain more perfect alignment can, if necessary, be done some forty-eight hours later ; if not, there is much justification for performing an open operation in order to clear out the blood clot and lever the fragments into position.

Flexion of the elbow beyond a right angle is a means of maintaining traction on the lower humeral fragment and of exerting a general splinting effect at the site of fracture, thus helping to hold the position gained by manipulation. It should not be relied on entirely to do this. The degree of flexion necessary varies, and can be best judged by radiographs taken in the theatre during the manipulation. A right angle of flexion may be sufficient for the purpose, especially when an accurate reduction has been obtained ; if, however, a greater degree of flexion is required in the presence of effusion, the risk must be estimated by the condition of the radial pulse, circulation in the fingers, etc., and weighed against the necessity for operative measures.

Without wishing to split hairs, may I again suggest that the title of these fractures be changed from " supra-" to " trans-" condylar? A supracondylar fracture is above the joint, while in the transcondylar—the common fracture in this region and the one in which complications are apt to occur—the line of fracture is within the cavity of the joint, making also a considerable difference to the period of disability.—I am, etc.,

London, W.1, March 7th. F. D. SANER, F.R.C.S.

Design of Experiments

SIR,—No one with less vanity than a film star could fail to recognize the kindness of your reviewer in his remarks on my book *The Design of Experiments* (*Journal*, February 22nd, p. 365). The author can but blush his acknowledgements. It does seem, however, just possible that some reader may have taken literally the humorous extravagance of his remark that more than 200 pages out of 250 are devoted to results obtained at Rothamsted Experimental Station. This is not to be taken seriously. One chapter, the eighth, of twenty-nine pages, is the extent of my tribute to this centre of a great experimental tradition. In addition several numerical examples are taken from field trials, for the simple reason that agriculture has been ahead of other sciences in the use of really good designs.

If, in this matter of experimental design, some other class of worker, such as veterinarians, bacteriologists, or vitamin chemists, had recently taken the lead in developing an improved technique, eminently suitable to the needs of their colleagues in other fields, would it not be desirable to call the attention of others to their success? For reasons which seem principally to belong to the past, workers in the more academic subjects are not in the habit of expecting advances in theoretical knowledge, relevant to their own studies, to be introduced from agricultural research ; this prejudice, I submit, makes it more than usually important to do it in this matter the justice which is its due.—I am, etc.,

University of London, Galton Laboratory, March 5th. R. A. FISHER.

Atmospheric Ionization and Influenza

SIR,—I have read with considerable interest your report of Sir William Hamer's paper, " Endemic Influenza Prevalences for the Three Years 1933–5," communicated to the Royal Society of Medicine on February 28th, in which he advances the hypothesis that the incidence and phases of influenza may be related to fluctuations in atmospheric ionization.

While it can perhaps hardly be maintained in the present state of our knowledge that the symptoms of influenza or of other epidemic diseases are attributable to other than toxins derived from infection by living parasitic organisms, a very considerable amount of evidence has accumulated in recent years to suggest that, in some manner as yet little understood, changes in atmospheric ionization affect profoundly, either directly or indirectly, the human organism, and, further, that phases in exaltation of virulence of micro- and ultra-microscopic organisms which affect man are determined either directly by electromagnetic radiations reaching the earth from the sun, or secondarily by atmospheric disturbances induced thereby which bring about physical and chemical modifications in their corporeal and extra-corporeal habitat.

Upon this hypothesis alone can we find explanation of otherwise inexplicable waves of epidemicity. There is in fact much reason to believe that, as Sir William Hamer suggests, increased susceptibility to infection is induced during certain states of terrestrial atmospheric ionization, and the main underlying determinant of waves of epidemicity is possibly to be found in modifications in virulence of specific organisms attributable to physico-chemical changes in their nidus induced by the cyclic stresses which occur in the earth's outer atmosphere, the source of which is to be found in the electro-magnetic storms which periodically occur in the depths of the gaseous envelope of the sun. It has, in fact, in recent years been shown that waves of epidemic disease covering considerable periods exhibit a very close correspondence with the phases of the sun-spot periods. In particular, close correlations over long periods have been found to occur in respect to diphtheria, typhus, and dysentery in Russia and Denmark by A. L. Tchijevsky, in respect to plague in India by Zabolotny, and in respect to influenza in Russia and the United States of America by Tchijevsky and others. In Russia quarterly curves of influenza incidence have been found to follow closely quarterly curves of sun-spot activity, while percentage retention of the organism of typhus abdominalis by the filters of the main aqueduct of Leningrad throughout the period 1892 to 1910 exhibits an all but complete correlation with the sun-spot curve.

Apart from microbic infections, evidence has also accumulated to suggest that a causal relationship may exist between sun-spot activity and psychopathological disturbances in man, and there is reason to think that, while in general these may be attributable to secondary changes in the earth's atmosphere induced by the electromagnetic radiations emanating from the sun, they may at times be induced by their direct action. So long ago as 1902 the Abbé Thomas Moreux, director of the Bourges Observatory in France, first made the suggestion that

outbursts of solar activity had an effect upon the human organism which manifested itself in an increase of nervous excitation and the accentuation of neuralgic pains. In 1927 Dr. Maurice Faure of the French Academy of Medicine, as the result of a large number of observations, advanced the theory that during the passage of large sun-spots across the solar meridian an increase in sudden deaths occurred, and he associated acute crises in certain chronic maladies with the same phenomenon. In the same year, at the International Congress of Public Health held at Dublin, I advanced the theory that suicidal and epileptic manifestations are associated with sun-spot activity, and I have found that there exists a close correspondence between suicidal incidence and the incidence of terrestrial magnetic storms secondary to sun-spot activity.

Tchijevsky, employing figures of the monthly incidence of mortality from diseases of the nervous system covering the period 1924 to 1927, has shown that an exceedingly close correspondence exists between this incidence and the sun-spot curve, while a close correlation between the frequency of epileptic fits and the incidence of solar storms has been demonstrated by B. Ammon and H. H. Kritzinger, and to the incidence of diurnal oscillations in the earth's magnetic field by M. V. Sokoloff. Incidentally, blood calcium content has been found by H. and R. Bakwin to vary as the intensity of ultra-violet radiation varies in relation to solar activity.

Apart from inferences drawn from statistical analysis of records of psychopathological incidence, a series of elaborately controlled experiments carried out by A. L. Tchijevsky, director of the Central Laboratory, Moscow, and his associates have shown that by means of experimental ionization of the atmosphere marked disturbances in the sexual behaviour of animals can be brought about, excitation gradually attaining a maximum, followed by a period of depression which is reached considerably sooner by increasing the degree of ionization. A practical result of Tchijevsky's researches has been the publication of a work under the auspices of the Soviet Academy of Agricultural Sciences, showing that by means of artificial ionization of the atmosphere a very considerable augmentation in the weight of poultry and of egg production may be brought about.

It is hardly necessary to refer to the well-known relationships which have been found to occur in respect to radio reception, lake levels, ice-needle blizzards, the growth of trees, abundance of harvests, bird migration, animal eruptions, and so on, with meteorological periodicities secondary to the solar cycle, all of which tend to confirm the hypothesis that the cyclicity of solar radiation may play a very important part in human physiological and pathological phenomena. While in other countries considerable advance has already been made in the institution of inquiries into the causal relationship between solar activity and terrestrial phenomena, in this country this very important and interesting subject has received as yet but very scant attention, and has in fact, like other revolutionary but now accepted hypotheses, met with a marked quantum of the scepticism so inseparable from the conservatism of English scientific inquiry. I regard Sir William Hamer's provocative paper as a very timely stimulus toward the encouragement of such investigation in this country, especially with respect to the association of the very complex changes which occur in the earth's atmosphere and the still more complex electromagnetic storms which arise in the sun's chromosphere, and to the effect of both upon the functionings of the human body.—I am, etc.,

C. CONYERS MORRELL, F.S.S., F.R.A.S.,
Medical Officer of Health, Borough of Christchurch, Hants, March 7th. Christchurch.

Tea for Burns or Scalds in the Home

SIR,—Dr. L. J. Panting's letter on the first-aid treatment of burns and scalds in your issue of February 29th (p. 446) gives me the opportunity of drawing attention to the use of a strong brew of tea as an alternative to tannic acid solution. Some years ago I was able to treat alternate cases of a series of fairly severe scalds in children with tannic acid and tea. So far as results went there was no difference between the two. For first-aid purposes in the home the brew of tea should be of the " lumberjack " variety, produced by boiling a handful of tea in a pan of water for a few minutes. Strips of linen may be sterilized by boiling them at the same time, and then lifted out and allowed to drip until cooled to body temperature before being applied as dressings. The fact that tea is to be found in any household renders it a much simpler and more universal family remedy than pure tannic acid solution. It is, I may add, not generally recognized that strong tea was an old wives' method of treating burns and scalds in Scotland in generations past. It was probably on the pseudo-scientific advice of our own profession that it was given up, and the community subjected to the horrors of carron oil.—I am, etc.,

D. STEWART MIDDLETON, F.R.C.S.

Edinburgh, Feb. 29th.

Ciliary Neuralgia

SIR,—As a practising rhinologist I mildly resent the attitude Dr. Wilfred Harris adopts in his *ex cathedra* pronouncements upon the matter of differential diagnosis. He has made an elaborate classification of pains about the head and neck which is surely inadequately founded, especially as he seems to regard most of the pains (in the true neurological tradition) as idiopathic in origin. One would have been disinclined to discuss his views had it not been for his introduction of a controversial point:

> " These cases are the happy hunting ground of the nose and throat surgeon, and antral washings, etc., are frequently done before a neurologist is consulted, and then perhaps the suggestion of alcohol injection or root section is mooted."

I happen to have had through my hands two unfortunate individuals in whom alcohol injections have been repeatedly carried out over long periods by a neurologist without improvement. In each of these cases there was gross and obvious evidence of sinusitis sufficient to cause the pain from which they were suffering. I would suggest, therefore, that diagnosis in the matter of pains is not quite so easy as Dr. Harris indicates in his paper.—I am, etc.,

London, W.1, March 7th. BEDFORD RUSSELL.

"Neo-natal Dermatitis"

SIR,—Surely dermatology is already laden with a sufficiency of names to cause one to hesitate before introducing a new one. Yet on the strength of their histological examination of skin removed from fatal cases of " pemphigus neonatorum " Drs. H. Carter and H. A. Osborn suggest that the name " subepithelial dermatitis " be substituted (*Journal*, March 7th, p. 465).

The choice of the term " dermatitis " is indeed an unfortunate one, for if, as the authors suggest, the condition can be attributed to a coccus it would be an innovation in nomenclature to refer to the disease as a dermatitis. Again, their reasons for adopting the qualifying adjective " subepithelial " are founded on investigations which may give rise to misleading histological pictures. In cutting sections of the skin of newborn infants brought to necropsy, particularly those dead of infectious conditions, an almost invariable result is an artificial cleavage at the epidermo-

dermal junction. In reality, if preparations are examined during life, one always finds a flaccid bulla, due to the collection of fluid among the upper layers of the stratum malpighii. This fact has been corroborated by all skin pathologists, and an excellent picture of it can be found in Kyrle's *Histobiologie der Menschlichen Haut und ihrer Erkrankungen*.

Pemphigus neonatorum, as viewed by all other workers, is exemplified by the presence of intradermal bullae not unlike those of pemphigus vulgaris, and is a condition affecting the newborn. Would it not be better if, on these grounds alone, we were to retain its original descriptive name?

With regard to its aetiology, an assertion is made that the causative organism is a chromogenic staphylococcus and not the streptococcus which has hitherto been accepted by MacLeod, Jadassohn, Leiner, and many other authorities. The difficulty of isolating the streptococcus, except in very early, non-contaminated lesions, is known to all, and is an experience common to this and all other primary streptococcal diseases, like impetigo contagiosa, which are only too readily infected secondarily with the staphylococcus. If the staphylococcus were the cause pemphigus neonatorum could be hailed as the only bullous skin condition resulting from this organism, hitherto considered to be selective for the pilosebaceous follicle. Is it not, too, the clinical experience of most that adults coming into contact with cases of pemphigus neonatorum are liable to contract impetigo contagiosa? The folliculitis not infrequently associated with pemphigus neonatorum usually appears a few days later, and not until the bullae become turbid as a result of the secondary staphylococcal invader.

Before accepting the findings of these authors we would therefore like to be assured that they have taken those precautions, outlined above, which the older dermatologists have deemed imperative.—I am, etc.,

London, W.1, March 7th. I. MUENDE.

Polythelia

SIR,—Mr. R. Graham-Campbell's memorandum on "Polythelia" (*Journal*, March 7th, p. 471) is particularly interesting as the illustration shows very well the occurrence of the nipples on the "mammary line"—that is, a line passing through the outer end of the clavicle and the spine of the pubis approximately—a point I stressed in my article "Polymastia."[1]

I believe all the mammae or nipples reported in such situations as the shoulder, back, buttocks, thighs, etc., to be pigmented moles only, and not true mammae. So far as I know they have never been proved microscopically or by change during menstruation or pregnancy, still less by active lactation. Purves and Hadley[2] report a case of active accessory breasts in the labia majora, but these were "on the line."

The most typical primitive arrangement of the mammary tract is seen in the sow, and man's earliest progenitors were probably like it: polymastic and productive of litters. Since then the mammary tract has been concentrated at the cephalic end of the trunk in the human species and in the caudal end in other species such as the cow, mare, goat, and ewe, these being the most convenient situations respectively for a sitting biped and a standing quadruped. The sow and bitch have each a similar arrangement, and both nurse their litters lying down.

There is some evidence that polymastic women, and also animals—for example, a cow—possessing *accessory* breasts—that is to say, over and above the normal udder—are more likely to have multiple gestations, and also that the condition of polythelia is sometimes hereditary, but not markedly so. If Mr. Graham-Campbell is still in touch with his patient it would be interesting to have her family history as to multiple births or the occurrence of breast anomalies.—I am, etc.,

Penzance, March 8th. G. B. RICHARDSON, F.R.C.S.

REFERENCES

[1] Richardson, G. B.: "Polymastia," *British Medical Journal*, 1928, i.
[2] Purves, Robert, and Hadley, J. A.: "Accessory Breasts in the Labia Majora," *Brit. Journ. Surg.*, 1917, xv, No. 58.

An Unusual Accident during Intramuscular Injection

SIR,—As I think that an accident on giving an intramuscular injection is very rare, the following account of one may be of interest to your readers, and an explanation may be forthcoming from some of them.

The patient, who recently came under my care, was suffering from subacute degeneration of the cord, and had previously been treated in London with injections of campolon, to which she had responded rapidly. I continued the treatment, and on the evening of September 30th, while the campolon was being injected, the patient suddenly felt very hot, with a rapid pulse and great throbbing in the head, and noticed a smoky taste. She did not complain at once as she thought the sensations would pass off, and she did not want to be "fussy." A moment before giving the injection I had taken the blood pressure, which was 160; two minutes after the injection had been given the blood pressure had risen to 220, and the patient looked and felt extremely ill and was very flushed. For the first minute the pulse was very irregular and rapid; the irregularity quickly disappeared, but the pulse continued very rapid and bounding for about ten to fifteen minutes, and I was afraid that the patient would collapse. In about twenty minutes the blood pressure had dropped to 190, about an hour later to 180, at 7 a.m. the following morning to 170, and in the evening it was only 150. Twenty minutes after the injection the patient passed a large watery yellow stool and a large quantity of urine. The bowel action was repeated four times in an hour and twice during the night. During the following week the patient, who suffers from diverticulitis and always takes liquid paraffin and Epsom salts, did not require them, as the liquid stools continued for a week, when they quite subsided and regained their natural colour; she then began to take the paraffin and salts as usual.

When giving intramuscular injections I always plunge in the needle unattached and carefully watch for any sign of haemorrhage before adjusting the syringe; on this occasion I saw no trace of blood, and injected, with the result described above. I presume that a very small vein had been pricked, converting the injection into an intravenous one, but that the amount of blood that escaped was not sufficient to come up through the needle to the surface. The patient has since had an injection of 4 c.cm. daily, which I have given very slowly, with no untoward results; but on five occasions she asked me to stop the injection when I had only given 2 c.cm., as she felt hot and flushed and noticed the smoky taste in the mouth. On each occasion before she spoke I had seen, but had not told her, that on my removing the 2 c.cm. syringe from the needle the colour of the liquid which escaped was changed, and appeared to be mixed with blood, so I did not give the remaining 2 c.cm. The patient was slightly flushed each time, but this soon subsided, and the pulse remained unchanged.

—I am, etc.,

Puerto Orotava, Tenerife. ISIDORO LUZ.

Euthanasia

SIR,—I note that in the *Journal* of February 29th Dr. Redmond Roche says he is startled by my views and that I am above the law—in fact, a law unto myself. Reading my previous letter and his you will see this is a compliment, though perhaps not so intended. One may be able to think for oneself in an emergency without the aid of

Parliament or any other body and yet not be lawless. There is a very good principle to act on in life generally, "Do as you would be done by." I think Dr. Redmond Roche or any other humane medical man would have acted exactly as I did in one case I can never forget. The patient was in agony, calling out "Oh, God, take me"; the entire family echoed the cry. The case was absolutely hopeless; it was only a matter of a day or so, or hours. I kept the patient deeply under morphine until she passed over. My belief is that such relief shortens life, but in the circumstances this does not matter in the least. Most kind-hearted doctors would do exactly the same, but there are many who, if they thought the shortening of life was wrong, would persuade themselves they had lengthened life. That is really immaterial: you cannot destroy life; you can merely shorten or lengthen its stay in a particular form. Would you, Sir, rather be attended at your latter end by a man who thought of you first and last, or by one who was determined at all cost to your feelings to keep you alive a few hours or days longer in order to satisfy some legal or ethical fetish?—I am, etc.,

London, W.1, March 2nd. W. GUYON RICHARDS.

Inoculation Against Whooping-cough

SIR,—I am glad to hear of the work in Edinburgh (*Journal*, March 7th, p. 502). Will Dr. Linklater forgive me for reprinting Professor Topley's words referring to vaccine prophylaxis with adequate controls:

"There must first come a stage of field trials, conceived in a frankly experimental spirit; even though this presented special difficulties to the administrator, it must be regarded as the most important link in the chain which led from observations in the laboratory to successful prophylaxis in the community."

—I am, etc.,

March 7th. THE ANNOTATOR.

Anaesthetization of Tympanic Membrane

SIR,—In reply to the letter of Mr. W. S. Thacker Neville in your last issue we wish to state that it has not been our experience that the solution for the anaesthetization of the tympanic membrane as recommended by the late Dr. Albert A. Gray "produced such great congestion that the landmarks disappeared." In Dr. Gray's series of cases and in our own the cocaine and aniline solution prepared and used according to the original published technique has proved entirely satisfactory, and we consider it unnecessary to employ general anaesthesia for the purpose of intratympanic injections of thyroxine.—We are, etc.,

GAVIN LIVINGSTONE.
D. WALKER ASHCROFT.

Ferens Institute, Middlesex Hospital, W.1, March 10th.

Recruitment of Medical Men in a National Emergency

SIR,—Now that defence schemes are in the air, might I suggest that the medical profession should give careful consideration to the situation which would arise in the event of a sudden outbreak of war?

Many of us in general practice are in the Army Reserve or Territorial Army, and would have to leave our practices at very short notice. Others would volunteer during the first few months, and many who have never thought of themselves as other than civilians would be forced to join up, if not through a sense of duty then under pressure of public opinion, or, if necessary, by some form of conscription. I have no doubt that the good will of the remainder would result in some scheme being improvised to protect the practices of their colleagues; but would it not be much better that such a scheme should be carefully drawn up in advance rather than during the excitement and anxieties of war, when those chiefly concerned would be absent and the remainder busy with the extra work thrown upon them?

The events of 1914 and of the past year show that wars are liable to break out very suddenly. We have in the B.M.A. and its Insurance Acts Committee machinery splendidly adapted for devising such a scheme in conjunction with the Ministry of Health, and an investigation into the whole question would be of great value.

May I stress the point that the matter vitally affects the interests of all practitioners of military age (an elastic limit in emergency), especially young men who have recently started in practice and are possibly still burdened with payments to be made for the goodwill of their practices or the purchases of house and car? If this matter were definitely cleared up I believe it would help the recruiting of officers for the Territorial Army and relieve those who have already accepted this responsibility of a needless anxiety.—I am, etc.,

HAROLD V. WALSH,
Ipswich, Suffolk, March 7th. Lieut.-Colonel R.A.M.C.(T.).

The Staffing of Infant Welfare Centres

SIR,—I fear I cannot allow to go unchallenged several statements concerning infant welfare centres made by Dr. John Lishman in your issue of February 29th (p. 446). He appears to misunderstand the function of these centres. They exist primarily for the guidance of mothers in the rearing of healthy infants, and not for the diagnosis of disease. When an infant is found to need treatment for illness it is referred by the public health doctor either to the family doctor, the district medical officer, or the hospital, according to circumstances. The duties of the infant welfare centre doctor are to inquire into the minutiae of the infant's routine—feeding, bowel training, sleeping, clothing, fresh air, exercise, etc.—and to give talks to the mothers, both individually and *en masse*, on such topics as balanced diets, vitamins, diphtheria immunization, etc., about which, otherwise, they remain hopelessly misinformed. Many opportunities also arise in which enlightenment can be given to mothers on the psychology of infancy and childhood, so that the word "naughty" is heard less often in the household vocabulary.

This attention to detail, which seeks to help the mother to keep her healthy infant healthy, is the root of the matter (minor ailments are purely incidental), and it is to be doubted whether a busy general practitioner, with a list in his pocket of patients awaiting a visit in their homes, would consider two hours well spent on twenty-five infants who "have nothing the matter with them."

It must, I suppose, remain a matter of opinion whether it is more "interesting" to prevent disease than to cure it. For myself, I consider the architect as worthy a craftsman as the house repairer, and I see no reason for public health doctors to become dispirited if they take a right view of their jobs. As the old hymn says:

"In this world of darkness,
We can all shine,
You in your small corner,
And I in mine."

—I am, etc.,

GRACE H. WOOD,
Bournemouth, March 3rd. Assistant Medical Officer of Health.

The "Grid-glow" Tube

SIR,—The issue of the *British Medical Journal* for February 1st has come to my attention, and I have just read the review of the second edition of *Electrotherapy and the Elements of Light Therapy*, by Dr. R. Kovacs of New York.

I am indeed sorry to learn that in the latter part of the review Dr. Kovacs is criticized for something for which he is in no way to blame. The "grid-glow" tube has long since passed the experimental stage, and is commercially available with several types of industrial equipment. Its utilization for medical purposes in a wave-current generator had been under development by our engineers for quite some time prior to the publishing of the second edition of Dr. Kovacs's book, and we had received very valuable co-operation from Dr. Kovacs in connexion with the clinical testing of engineering models of this wave generator. When the manuscript of the second edition of the book was ready for the publishers we considered our development work completed, and had started to prepare for the marketing of this apparatus. Unfortunately, however, by the time our market surveys had been completed it became evident to us that commercial exploitation of this apparatus would not be expedient, but it was then too late for Dr. Kovacs to change that part of his book. We are still withholding this apparatus until times are more favourable for its commercial introduction.—I am, etc.,

C. J. JOHNSON,
General Manager, Westinghouse X-Ray Company, Inc.

Long Island City, New York,
Feb. 20th.

Status of the Radiologist

SIR,—Dr. Norman Henderson again calls attention to this subject in the *Journal* of March 7th (p. 502). Surely it is time this bogy was disposed of for good and all. After all, status really implies the respect in which a man is held by his fellows on the hospital staff and by the local practitioners. A man is judged by his results; the radiologist who makes the largest percentage of accurate diagnoses, no matter how he gets them, has little reason to complain of his status. Major D. B. McGrigor (p. 476) suggests higher general qualifications, but however great the value of academic degrees at the outset it is ability which counts in the end, and surely the D.M.R.E. should be able to stand on its own merits.

Dr. Henderson's remarks on "whitewashing" the stomach are ill timed and in bad taste. This technique was introduced by Rieder in 1904, and it is always dangerous to criticize the work of these early pioneers; their results compare favourably with those of the present day, due allowance having been made for their primitive apparatus. The return to this technique is strongly advocated by many eminent men abroad and by at least two men in this country.—I am, etc.,

A. P. BERTWISTLE, F.R.C.S.Ed.

London, W.1, March 9th.

Light on Rheumatism

SIR,—Dr. W. S. C. Copeman has done well to call the attention of your readers to the article on rheumatism in the *Osteopathic Review*. A possible explanation is that some of the gas which we know to be associated with the spinal vertebrae has escaped into other joints. The need for anti-gas instruction of the public would appear to be more urgent than ever.—I am, etc.,

E. KAYE LE FLEMING.

Wimborne, March 9th.

THE SIR CHARLES HASTINGS LECTURE

The Sir Charles Hastings Lecture of the British Medical Association, which was delivered on March 10th, was divided into two parts, each part being assigned to a separate individual. The general subject was "Keeping Fit," and the lecturers were Dr. Winifred Cullis, professor of physiology of the University of London, and Dr. R. Cove-Smith, physician in charge of the Rheumatism Clinic of the Hospital for Sick Children, Great Ormond Street. Dr. Cove-Smith is better known to the general public for his prowess in the football field, and another medical athlete was in the chair in Dr. Adolphe Abrahams, consulting medical adviser to the British Olympic athletic team. Such a platform attracted a record attendance of over six hundred, almost every seat in the Great Hall of the Association House in Tavistock Square being filled.

We shall give next week an account of each of the lectures. Professor Winifred Cullis devoted the half-hour which was allotted to her chiefly to a discussion of the constituents of food and the role of vitamins in health and nutrition, but she touched also on the question of exercises, especially for women. Dr. Cove-Smith ranged over a wide field, passing from food to questions of ventilation and proper breathing, healthier housing and improved sanitation, sunlight and clothing, exercise, rest, and sleep. Both lecturers were very practical in their counsel. At the end there was no lack of questions from the audience, but these had to pass the censorship of the chairman, who turned a number of them down on the ground that they were so elaborate as to require another lecture by way of answer. Perhaps to forestall the inevitable, he put a leading question himself, whether any special virtue resided in the protein of flesh foods, and asked Professor Cullis to answer it as a physiologist and Dr. Cove-Smith as an athlete. Professor Cullis's reply was that if a minimum amount only were available it was necessary to have a protein as like as possible to that of which one's body was built, but if sufficient first-class protein were available in the form of milk, eggs, and cheese there would be no deprivation. Dr. Cove-Smith replied that if muscle were wanted it should be in the form of flesh food, but to the athlete excessive muscle was regarded as waste, and what he chiefly needed was first-class protein in a readily assimilable form and carbohydrates which he could burn up quickly. The dangerous passage of vegetarianism versus flesh foods having been rounded, the way was open for a number of questions, especially on vitamins, as to whether, for example, there could be vitamin excess, what was the effect of tinning and canning of foods on vitamin content, what sort of food was most useful for preserving the teeth, at what age meat should be introduced into the child's dietary, whether nudism was a help to physical fitness, and whether hot-water bottles in bed should be used by healthy persons. Indeed, Dr. Abrahams suggested that on the next occasion it might be a good idea to dispense with the lecture altogether, put an expert or two on the platform, and devote the whole time to catechism.

Vote of Thanks

Dr. E. Kaye Le Fleming, the Chairman of Council, in proposing a vote of thanks to the chairman, Dr. Abrahams, mentioned the recent publication by the Association of the booklet *Family Meals and Catering*, of which about 100,000 copies had been sold. He also stated that an important committee appointed by the Council had during the last eighteeen months been studying the subject of physical education in its widest aspect as applied to all classes in the community, and the report of

that committee was now in a draft stage and would be issued before long. The chairman of the evening had assisted the committee from his great experience of athletics and games. This year's Hastings Lecture was voted one of the most successful of the series, both in the public interest shown and in the handling by the two lecturers of their theme.

THE RED CROSS IN WARFARE

A memorandum on observance of the Red Cross in warfare has been prepared by a number of members of the medical profession with a view to its presentation to the Italian Ambassador. The signatories express their profound uneasiness at the news of certain incidents in the course of the present war between Italy and Abyssinia, and in particular at reports of the bombing from the air by Italian forces of units clearly displaying the Red Cross. "In war time the wounded and those who attend them have for long past been considered as in a sanctuary when beneath the Red Cross. Amongst civilized peoples the Red Cross has been looked upon as an assurance that above the shifting tides of national strife, commercial rivalry, and war there lives the true bond of common humanity. If this permanent bond, symbolized by the respect customarily paid to the Red Cross, is also to be destroyed then mankind takes a further step backwards towards the chaos of barbarism. . . . It is necessary that all who follow the vocation of medicine should insist that the symbol of the Red Cross in war be held absolutely sacrosanct." Those signing the memorandum include the Right Hon. Christopher Addison, Professors Millais Culpin, A. H. Burgess, W. M. Frazer, E. J. Wayne, M. Greenwood, and J. R. Marrack; Lieut.-Colonel Clayton Lane, Mr. Somerville Hastings, Mr. Cecil Joll, Mr. Lionel Colledge, Mr. F. D. Saner, Mr. Philip Mitchiner, Mr. C. Lambrinudi, Mr. P. G. Doyne; Drs. H. Crichton-Miller, David Forsyth, R. D. Lawrence, R. A. Lyster, S. V. Pearson, Alfred Salter, R. F. Collis, Stella Churchill, Doris Odlum, H. W. Barber, E. W. Goodall, E. P. Poulton, J. D. Rolleston, A. F. Tredgold, J. M. Vaughan, Helen Gillespie. Others wishing to associate themselves with it may communicate with Dr. T. O. Garland, 23, South Hill Park Gardens, N.W.3.

The Services

HONORARY SURGEON TO THE KING

Surgeon Rear-Admiral B. P. Pick, O.B.E., has been appointed Honorary Surgeon to the King.

HEALTH OF THE ARMY

In a short memorandum relating to the Army Estimates for 1936 (Cmd. 5109: H.M. Stationery Office, price 2d.) the Secretary of State for War makes the following reference to the medical services:

The health of the Army remained very satisfactory throughout the year, and there was no undue incidence of epidemic disease. The increase in the number of candidates for commissions in the Royal Army Medical Corps which followed the introduction of improved conditions of service in 1934 has been well maintained, and there is evidence that a military medical career is increasing in popularity, thanks to the helpful co-operation of the British Medical Association.

The annual report on the health of the Army for 1934 contains ample evidence of the good work which is being done by the Royal Army Medical Corps, particularly in the province of clinical work and preventive medicine. New conditions of service have been recently approved for officers of the Army Dental Corps and for the Queen Alexandra's Imperial Military Nursing Service, and the number of candidates now coming forward is satisfactory. There are at present 28,620 enrolled and efficient members of Voluntary Aid Detachments, of whom 6,736 have signed a "mobile" obligation; the corresponding figures for last year were 27,750, and 6,390.

Obituary

H. J. BANKS-DAVIS, M.B., F.R.C.P.

Consulting Surgeon, Throat and Ear Departments, West London Hospital

For the fourth month in succession British otology and laryngology have been robbed of one of their most distinguished exponents by the passing of Henry John Banks-Davis, M.A., M.B., B.Ch., F.R.C.P. He was educated at Marlborough and Trinity College, Cambridge, and qualified from St. Thomas's Hospital in 1895, where he held the appointments of house-surgeon and demonstrator of practical surgery. It was perhaps the latter post which enabled him later on to deal so successfully with cases in which some primary lesion of the nose, ear, or throat had spread to more distant regions.

After leaving St. Thomas's Banks-Davis did wisely to study in Paris, Berlin, and in that Mecca of oto-laryngology—Vienna—where he sat at the feet of such teachers as Politzer, Chiari, Schroetter, Hajek, and their skilled assistants. On his return to London he was appointed assistant physician to the West London Hospital in 1900, and in 1904 assistant to the late James Barry Ball in the ear, nose, and throat department, of which he took full charge in 1908, and served it faithfully and efficiently until his resignation in 1926. His outstanding abilities as a teacher and brilliant practical exponent of the science and art of his specialty were quickly recognized, and it was not surprising that in due course his colleagues elected him president of the West London Medico-Chirurgical Society, and that he later occupied similar positions in the Sections of Laryngology and Otology of the Royal Society of Medicine. During these more active years of his work his colleagues who had charge of the ear and throat departments of the larger hospitals in London often wondered how it was that Banks-Davis could always be depended upon to bring rare and interesting cases to the meetings of those Sections. The only explanation to be offered—and obviously the correct one—was that hospital patients in the neighbourhood of Hammersmith or beyond it quickly learnt that times had changed, and that it was no longer true that all the wise men came from the East, for surely their star always shone over the West London Hospital.

Although our friend, whose loss we now mourn, was of a retiring disposition, he had many friends both in and without his profession, and all regarded it a privilege to visit him in his London home in Portman Street. Herein were to be seen some fine examples of oil paintings by his father (Henry William Banks-Davis, R.A.) and those of other contemporary artists. On other walls were proofs of his skill as an angler, which he exercised in the waters around his country home, Glasllyn House, Rhayader, S. Wales. That gentle art clearly and fittingly exemplified the love of retirement into peaceful surroundings which made so strong an appeal to him and went far towards the moulding of a charming personality. H. T.

Another colleague sends the following tribute:

When trying to recall the memory of those who were dear to us and who have passed over, we are prone to bring first into focus their physical characteristics, and these are more sharply defined in some than in others. Banks-Davis will be visualized, I think, by most of us for two characteristics: an amplitude of form and an extremely kindly smile. It was some considerable time after I first became associated with Banks-Davis as his assistant surgeon in 1927 that I learnt (not from his own lips—as he was very averse to talking about himself) that his proportions had considerably altered since he was a young man. How many of us know that he

played rugger for Marlborough, that he rowed in the First Trinity boat at Cambridge, and was well known in the athletic world as a first-class sprinter? In his later years his sporting instincts had perforce to become modified, and he became an enthusiastic angler on the waters of his estate in Wales. His kindliness was not confined to his smile: his nature was kind and very genial. Although critical of himself, he could not tolerate ill-considered criticisms of others. Banks-Davis had breeding and culture, and was endowed with a personality which commanded respect. Working with Banks-Davis was a pleasure and at times almost an inspiration. He seemed to possess an uncanny sense of diagnosis, and what appeared to be a cursory examination of a complicated laryngeal case would furnish the correct answer to the nature and extent of the disease. By the passing of Banks-Davis we have lost a personality, a skilled surgeon, and a friend.

M. V.

Mr. Banks-Davis had been a member of the Marylebone Division of the British Medical Association since 1897. When the Association held its Annual Meeting in London in 1910 he held office as honorary secretary of the Section of Laryngology.

SIDNEY H. CLARKE, M.D.

Surgeon, St. Albans and Mid-Herts Hospital

By the death of Dr. Sidney Herbert Clarke on March 5th from pneumonia, after only a few days' illness, St. Albans and Hertfordshire lose a most energetic and highly respected practitioner, widely experienced in many branches of the profession. He was in his fifty-eighth year, came of a well-known Leicester family, and was the son of the late Dr. Julius St. Thomas Clarke of Leicester, who was surgeon to the Leicester Royal Infirmary for over thirty years. From Oakham School, Rutland, he went to Caius College, Cambridge, where he graduated B.A. in the Natural Sciences Tripos of 1900. Continuing his medical studies at the London Hospital, he qualified M.R.C.S. and L.R.C.P. in 1904 and graduated M.A., M.B., B.Ch.Cantab. in 1905 and M.D. in 1909. He held the appointments of senior assistant medical officer at the Leicester and Rutland Asylum and assistant medical officer, Newport Borough Asylum and County Asylum, Prestwich.

Shortly before the great war Dr. Clarke settled in St. Albans, taking over the practice of his brother-in-law, the late Dr. Nuttall, but on the outbreak of war he immediately volunteered, and served in France with the 1st Hertfordshire Regiment and the 10th Hussars from 1914 to 1919 as captain R.A.M.C. His health undoubtedly suffered. On demobilization in 1919 he took keen interest in the work of his profession and in local organizations which made a call upon his professional services. He held the appointment of honorary surgeon to the St. Albans and Mid-Herts Hospital, for which he worked most intensively and assiduously, but the medical practitioners of Hertfordshire have cause to remember the excellent work he carried out as secretary for the Herts Local Medical and Panel Committee. He will be sadly missed in this latter connexion, and his position will be hard to fill. As a member of the B.M.A. he was most enthusiastic, and had held the position of chairman of the St. Albans Division, and was extremely active during the dispute with the Government and the B.M.A. over the Insurance Acts. In other spheres of work he was intensely interested: he was one of the founders before the war of the St. Albans (Herts 38) V.A.D. ; was keen on the work of the St. John Ambulance, and was one of the examiners ; also in the activities of the St. Albans scouts and girl guides. He was president of the Old Contemptibles Association and a vice-president of the St. Albans Branch of the British Legion.

Dr. Clarke was a man of boundless energy, despite his spare form, was shrewd in criticism, gifted with remarkable insight and intrepidity, and, although impulsive at times, always realized when he had made an error of judgement. He was a good friend professionally and socially, and will be sadly missed.

J. J. S.

Two other colleagues send the following appreciation:

The county of Hertfordshire has by Dr. Sidney Clarke's death lost one of its most valuable men, and not only the county, but the British Medical Association as well is deprived of a staunch and valiant adherent of its chief interests. We his colleagues mourn his loss, and appreciate fully the difficulty of carrying on the burden of his great work for the medical profession of Hertfordshire, shown particularly in his unselfish and untiring efforts in connexion with the national health insurance. Our appreciation of his services in this sphere is, we know, shared by the county officials, who so valued his co-operation in all cases of difficulty. There are many practitioners who feel to-day as if a personal friend had gone from among them, and many, especially the younger men, who would gladly acknowledge how much they owed to his help and practical assistance. He had been secretary of the Herts Panel Committee for fifteen years, during which time he constantly laboured to produce a machine fitted to do a great national work, and one that would reflect credit upon the county. Above all, he did his best to be fair in all his dealings, both officially and privately. Every past and present member of the Panel Committee will mourn the loss of a good friend and a magnificent worker.

C. H. H.
K. J. A.

THE LATE PROFESSOR PAVLOV

We are indebted to Professor E. D. ADRIAN, F.R.S., for the following tribute:

Professor Ivan Petrovitch Pavlov—Academician Pavlov, as they called him in Russia last summer—was the most celebrated physiologist in the world, celebrated for his scientific discoveries, for his originality of outlook, for his position in Russia since the war, and for his vivid personality. An octogenarian with the vigour of a man of 50 must always be a source of pride and encouragement to his friends, but Pavlov kept an energy and zest in life that was almost boyish. He was simple, unaffected, and courageous ; impatient and grumbling sometimes when people made long speeches in languages he could not understand, but always alert and interested in what was going on. In the earlier phase of his work, when he studied gastric secretion, his originality showed itself in the remarkable technique of the Pavlov pouch, the miniature stomach opening on to the surface of the body. This is a good example of one of those simple ideas which are never thought of until a stroke of genius has brought them to birth.

In his later work on conditioned reflexes not only the technique but the whole conception was so original that it is still very difficult to tell what the outcome will be. That it marks a new stage in the investigation of the central nervous system there is no doubt at all. To study behaviour objectively, and to describe it in strictly physiological terms is not so easy, but Pavlov was able to think of it in the same terms without bringing in those psychological conceptions which he disliked so much. He thought, and many have followed him, that psychology was no fit partner for any branch of natural science, and that physiology was degraded whenever it admitted psychological terms. Until we can copy him in this

deliberate rejection of the mind we shall find it hard to see where his work was leading. We may think that his idea of a conditioned reflex has a profound philosophical and sociological import, or that he was only describing phenomena familiar to anyone who has taught a dog to sit up and beg. Both judgements suggest an emotional bias: Pavlov's work may lead ultimately to the conclusion that the mind is always an unnecessary hypothesis, but all that he showed or claimed to show is that it is unnecessary in describing the process of learning in animals. Equally his results have a far greater value than any empirical study of animal training could have, because he fitted them so strictly into a mechanistic frame. In fact, the great merit of his work is that he introduced a new way of thinking about animal behaviour, a way which has been, and will be, most fruitful, although in time some other way may come to take its place.

Pavlov himself was the experimenter, with a greater regard for fact than for theory. He was not so wedded to his conclusions that he could not bear to change them. When at the International Physiological Congress in Edinburgh in 1923 his son, lecturing for him, announced the inheritance of a conditioned reflex in mice, Pavlov beamed with delight at the audience ; later he found that the evidence was not good enough, and published a simple statement to that effect without undue regrets or excuses. No doubt in his long life he suffered the usual disappointments of the investigator, but part of his singular charm lay in the fact that he seemed to be a really happy man —in his work, his family, and his surroundings, whatever they happened to be. That he was also a truly great scientist explains the universal admiration in which he was held. It is pleasant to think that in the last year of his life this admiration found expression at the International Congress in Leningrad, and that he lived to see the high rank given to physiological research in the endeavours of his country.

The death is announced of Dr. HANS BOGUSAT, councillor of the German Government, and a high official of the German Health Service. He represented the German National Red Cross Society on the International Standing Committee on Seamen's Welfare.

Universities and Colleges

UNIVERSITY OF OXFORD

An election of two members of the Board of the Faculty of Medicine, vice Dr. C. F. T. East and Dr. C. P. Symonds, who are not re-eligible, will be held on Friday, June 5th ; the members elected will come into office on the first day of Michaelmas Term, 1936, and will hold office for two years from that day. The General Medical Electorate consists of all Oxford graduates in medicine who are members of Convocation. The Board of the Faculty of Medicine includes four members elected by the General Medical Electorate who must be members of that body and of whom three at least must be persons engaged in teaching one or more of the clinical subjects of the faculty. Nominations of duly qualified candidates for election will be received by the Secretary of Faculties at the University Registry, Oxford, up to 10 a.m. on Friday, May 15th. Each nomination must be signed by six members of the General Medical Electorate, and no candidate will be eligible whose nomination has not been received before that date.

UNIVERSITY OF CAMBRIDGE

R. V. Payne has been examined and approved for the degree of M.Chir.

The titles of medical degrees were conferred on the following members of Girton and Newnham Colleges during February, 1936:

B.CHIR.—M. Ball and Mrs. P. M. Dobbs (Newnham), E. L. Willis (Girton).

Medico-Legal

A FATAL DOSE OF PARALDEHYDE

Strangeways-Lesmere v. Clayton and Others

On March 6th Mr. Justice Horridge delivered an important judgement concerning the liability of a hospital for the negligence of its nurses in administering medicine to a patient.

In the case of Strangeways-Lesmere *v.* Clayton and others the plaintiff sued two nurses and a hospital board for damages for the death of his wife. According to the findings of the learned judge, on May 2nd, 1935, she was admitted to the Weymouth and District Hospital for operation. On May 6th the house-surgeon, acting on the instructions of the consulting surgeon, wrote on the bed card instructions for preparing the patient for operation: six drachms of paraldehyde and a dose of atropine were to be given at 8.30 p.m. Later he decided that the paraldehyde should be given at 8 p.m., and gave this order to the day sister, who told the ward sister that the patient was to have six drachms of paraldehyde in nine ounces of water per rectum at 8 p.m. ; that the bed card said 8.30, but that only related to the atropine. The ward sister wrote out the instructions that six drachms of paraldehyde was to be given in nine ounces of water at 8 o'clock, and also the words "Please see bed card for atropine at 8.30." She handed this to Nurse M., one of the defendants, who looked at the bed card and saw the time 8.30, and queried the written instructions ; the ward sister confirmed that the time had been altered. Nurse M. did not look at the card to see the quantity of paraldehyde which had to be given, because the paper, she said, stated six ounces as the dose of paraldehyde. Another nurse, C., corroborated her evidence on this point. Nurse M. poured out the six ounces and Nurse C. checked the dose, but neither of them looked at the bed card. The patient received the dose and never recovered consciousness. The day sister, who saw the paper next morning, gave in evidence that the dose ordered was six drachms and not six ounces.

Mr. Justice Horridge found that Nurse M. and Nurse C. had been negligent, and would have been so even if the ward sister had written six ounces. Nurse M. ought to have noticed that the dose on the bed card was six drachms, and both should have looked at the bed card in measuring out the dose. Nurse M., moreover, was negligent because on the paraldehyde bottle the ordinary dose by the mouth was stated to be one-half to two fluid drachms, and she admitted in evidence that she knew that the dose per rectum would be at most three times that by the mouth. In fact she gave much more than this.

Liability of Hospital ?

His Lordship then had to decide whether the hospital was liable for the negligence of the two nurses. Very briefly stated the question was whether in giving medicine the nurses were servants or agents of the hospital in the legal sense, so that the hospital authorities had control over them and could supervise or make regulations governing this activity, or whether the nurses were independent experts. Following the lines laid down in Hillyer *v.* St. Bartholomew's Hospital, [1909] 2 K.B. 820, he decided that the hospital was not liable. In that classical case Lord Justice Kennedy said that the hospital authority was not liable if members of the professional staff, of whose competence there is no question, act negligently towards a patient in some matter of professional care or skill, in which the governors neither do nor can properly interfere, either by rule or supervision. The hospital is liable for the performance by its staff of "purely ministerial or administrative duties, such as attendances of nurses in the wards, the summoning of medical aid in emergency, and the supply of proper food, in which it ought to make, and does make, its own regulations." Mr. Justice Horridge, taking this criterion, held that the giving of the paraldehyde was a matter, not of routine, but in which the nurse was to use professional skill. It was not work which she was put in the place of the authority to do or which the authority intended to do for itself.

Mr. T. K. Eastham, K.C., who appeared for the husband, argued that as there was admittedly a practice in the hospital as to the checking of doses of dangerous drugs—that all doses should be checked by the sister or her deputy—a notice ought

to have been displayed prescribing the practice. His Lordship held that the omission to put up notices was not an act of negligence by the hospital authorities. He gave judgement for the agreed damages, £100, and costs against Nurses M. and C., and dismissed with costs the claim against the hospital.

Subject to appeal, it is therefore laid down by a judge of the High Court that the administration of medicine by a nurse in the circumstances of this case is a matter of professional skill, for her negligence in which the hospital is not responsible. As the circumstances were very ordinary—the premedication of a patient who was to undergo an operation next day—the decision may well extend to all administration of medicine by nurses in the ordinary course of routine.

Medical Notes in Parliament

[From our Parliamentary Correspondent]

Defence, Army Estimates, and Supplementary Estimates occupied the House of Commons this week.

The Bridport Joint Hospital Distribution Bill was read a second time in the House of Commons on March 4th.

The period during which a motion can be moved in the House against the Poisons List and Poisons Rules has expired, but the University M.P.s understand that Sir John Simon may find administrative means of meeting their objections to points in the Rules.

In the House of Lords on March 10th Earl De La Warr moved the second reading of the Bill which extends for a further eighteen months the provisions of the Milk Act, 1934. Viscount Astor said that as chairman of the League of Nations Commission he knew what was being done under the auspices of the League to develop a nutrition policy in this and other countries. The fact was beginning to be appreciated that if children had an ample supply of milk they would become healthier and better citizens. It was unlikely that there would be a spectacularly large increase in the consumption of milk through the supply of cheap milk to schools, but he hoped that the increase would be steady. Unless the price to the consumer could be substantially lowered there would not be the full consumption of milk which was desired. Three ways by which the price of milk could be lowered were: reduction in the price of distribution, reduction in the cost of production, and a subsidy. Something should be done along these three lines. There was a very large surplus supply of milk because the producers' price was too high; the aim should be to produce as much cheap milk as possible.

The Bill was read a second time.

In the House of Lords on March 10th the Shops Bill was read the third time and passed.

The Employment of Women and Young Persons Bill has passed through Standing Committee and its amended text has been issued.

Alcohol in Road Accidents

On March 4th Mr. Charles Taylor moved a resolution welcoming the reduction in road accidents and urging on the Government the necessity for pressing measures to secure further reduction. The main reason for accidents was, in his opinion, the state of the roads, and he asserted that in wet weather the accident figures went up by leaps and bounds. The Ministry had no power over local authorities in regard to the construction of roads. Some central authority should have power to enforce uniformity of construction. The lighting of many roads was inadequate. Motorists thought by the police to be under the influence of drink should not be tested by "tongue-twisting phrases." A medical officer should be called immediately to every person accused of being under the influence of alcohol.

Dr. Salter said the accident and death rate on the roads had not been reduced as much as it could have been. That drunken motorists must be suppressed was the universal opinion, but a much greater danger was the "sub-intoxicated" motorist. The British Medical Association, when requested by the Minister to advise on this subject, had improvised that term to indicate a person who, though not obviously under the influence of drink in the legal sense, was physiologically under that influence, and his driving powers thereby prejudiced. The Minister, though this expert advice was given him at his own request, had taken no steps to bring before the motoring public the extreme danger of taking alcohol when driving or before driving. The Association appointed a committee of fifteen eminent people, only four of whom were known to be total abstainers. Their report confirmed the views of two previous definitions, but the Minister did nothing except to insert in the *Highway Code* a clause which specially cautioned drivers against travelling when affected by alcohol and fatigue. Dr. Salter went on to explain that the British Medical Association committee reported that an ordinary dietetic quantity of alcohol, insufficient to produce obvious changes, affected the delicate neuro-muscular co-ordinations and the capacity to drive. It was not a matter of opinion but of fact that the reaction time which was normally one-fifth of a second became two-fifths or as much as four-fifths of a second if a man took a single glass of beer, a nip of whisky, or a glass of port. In an extra fifth of a second a car travelling at thirty miles an hour would proceed nine feet, or one travelling at fifty miles an hour fourteen feet six inches. The committee also pointed out that judgement of distance was affected, and recent experiments had shown that small quantities of alcohol reduced the field of vision. The judgement of many experts was that at least 25 per cent. of the fatalities and accidents on the roads of the United Kingdom to-day were due to the drivers concerned having taken a small quantity of alcohol, though they were not recognizably intoxicated.

Mr. E. W. Salt contended that 10 per cent. of the fatalities and injuries on roads could be prevented by the use of modern lighting. When all petrol-driven vehicles were considered and their mileage computed from petrol consumption there was an increase of 70 per cent. in fatalities in December as compared with June.

Sir Ernest Graham-Little spoke on the use of scientific tests for motor drivers. He was surprised that the experience of the medical profession in the case of factory accidents had not been more employed on the cognate subject of road accidents. The same rules applied to both. The categories of cases of road accidents published from time to time by the Minister of Transport betrayed lack of imagination and knowledge. In 4,000 cases examined only seventeen persons were said to be suffering from illness, an obvious underestimate. The second category was of persons said to be under the influence of drink or drugs, and the third was of those who were asleep while driving. Many other causes were at work, and Sir Ernest pleaded for a more thorough investigation of them. Selection tests in use in this country for ten years, and in many other countries for longer periods, had shown that a section of the public was accident-prone. The accident-prone person could be identified almost at once by suitable tests. A satisfactory feature of these tests was that when, by examination, the driver was made aware of the cause of the accident the cause might be removed and the driver cured. Far from creating hypochondriacs, the tests would help drivers to be confident. They were not difficult to apply. The apparatus was simple. The most expensive equipment, that for the "battery test," cost about £60. The individual test need not exceed half an hour, and six candidates could be tested in an hour by a trained person.

Mr. Hore-Belisha said that in 1910 there were 30,000 fatal and non-fatal accidents. The annual total ascended almost without a pause until in 1934 it reached over 200,000. The period coincided with the ever-accelerating output of mechanically propelled vehicles. The number of these on the roads in 1935 increased progressively at an average rate of about 450 a day; and the addition still continued. So quickly had this development occurred that engineers and surveyors had not yet been able to evolve, as in the case of railways, the means of assuring the free flow of traffic in conditions of method and safety. He gave the House details of how the Ministry of Transport and the highway authorities were proceeding with the task. They took as the unit of width for each line of

traffic a minimum of ten feet. Where the flow of traffic amounted to 400 vehicles at the peak hour—an average of more than six or seven a minute—more than two traffic lanes would be necessary and a dual carriage-way be provided, in addition to the indispensable footpaths and separate accommodation for cyclists and horse-riders. He denied that he had suppressed the report from the British Medical Association committee. The Association published the report, and it would not have been right for the Government to do so. No proposal emerged from the report which he could put into operation, but he had mentioned the subject in the *Highway Code*.

Sir FRANCIS FREMANTLE said this did not bring home to people that the least quantity of alcohol taken before driving a car involved danger.

Mr. HORE-BELISHA replied that he could not prevent people from driving cars who had taken some alcohol; he could only call attention in general terms to the subject. Arrangements had been made with the Home Secretary, as from the beginning of April next, for an analysis to be made not only of fatal but of all road accidents involving either death or injury. This would involve the study of about 200,000 separate occurrences. Comparing 1933, a year in which there were no pedestrian crossings in London, with 1935, in which they were laid down, there was a reduction in pedestrian fatalities of 24 per cent. and in pedestrian injuries of 12 per cent. The speed limit also had had a great effect in lessening casualties. The year 1935 was the first since the war to show a reduction in the aggregate of killed and injured on the roads. In 1936 so far the tendency continued, and the reduction until February 22nd was 19 per cent. in the killed and 8 per cent. in the injured.

The House then accepted the motion as proposed by Mr. Charles Taylor.

Psychological Treatment of Delinquents

Mr. HERBERT MORRISON opened, on March 5th, a debate on Home Office subjects, the occasion being a Vote on Account for the Civil Estimates.

Mr. G. BENSON raised the psychological treatment of delinquents. He recalled that a departmental report issued in 1932 contained a section dealing with psychological treatment, and recommended the Home Office to experiment. That Office immediately appointed a psychiatrist, who was now working at Wormwood Scrubs. Mr. Benson appealed to them to go further. The psychological treatment of criminals was in an experimental stage, but so was the treatment of cancer. Treatment and experiment were bound to go hand-in-hand. Psychiatrists should be allowed every facility for the treatment of delinquents so that they might extend and improve their technique. A brilliant band of psychological specialists were working on this matter, but had to apply a long, arduous, and difficult technique, and were hampered by lack of funds and of buildings. There was the single Government psychiatrist at Wormwood Scrubs. Six London hospitals had psychological clinics which occasionally took delinquents. At the Institute of Medical Psychology treatment of delinquents was a side-line, though valuable work had been done and valuable data collected. A new body, the Institute for the Scientific Treatment of Delinquency, was the only one in the country dealing with the psychiatric treatment of criminals. The type of crime treated was not merely the sex case. The Institute for the Scientific Treatment of Delinquency treated in 1934 and 1935 the following: attempted murder, 1; violence, 7; attempted suicide, 9; sex cases, 36; wandering, 13; theft, 46; shoplifting, 14; embezzlement, forgery, and false pretences, 26; others, 29. A boy had been cured of persistent pilfering by the discovery in his unconscious mind of a guilt-complex, with a demand for expiation, which induced him to commit these thefts in order to invoke punishment on himself. An educated man, serving a third sentence for homosexual offences, had been entirely cured by treatment from the Institute of Medical Psychology after the governor and the prison doctors had told him he was a hopeless case. London magistrates were awakening to the fact that in many cases there was some alternative to mere punishment. In 1935, they sent to the Institute for the Scientific Treatment of Delinquency twice as many cases as in 1934 and nearly broke the institute. Facilities in London for this treatment were hopelessly inadequate, and in the provinces they were non-existent. Outside London only four doctors had the qualification of the Institute of Psycho-analysis. Psychiatric treatment, not merely of delinquents but of any neurotic person, was slow, arduous, and extremely difficult. A doctor might have to give 400 hours to one case. To allow this treatment to depend on the voluntary work of a handful of specialists was out of the question. Sooner or later the Home Office would have to provide its own trained psychiatrists and regard this as a curative branch of the prison service. There were few statistics on the subject, and no psychologist as yet sat on the bench to advise the magistrate that particular cases would answer to psychological treatment.

Mr. GEOFFREY LLOYD, in reply, said there was a scientific basis for psychological theories, but psychologists had not achieved agreement among themselves, and that would indicate a need for caution in advancing along those lines. The Home Office had sent to courts of summary jurisdiction a circular drawing attention to the desirability of obtaining a medical report on the offender in any case where his circumstances, or his behaviour before the court, suggested doubt on his mental condition. There might be some offenders not mentally normal who required restraint, and could only be sent to prison. How treat them there? The appointment of a specialist in psychology as part-time medical officer at a London prison was experimental, but would be continued. The Home Office had not closed its mind on the subject, but could not take rash decisions on matters not fully explored.

Mr. RHYS DAVIES, Sir RALPH GLYN, and Mr. KELLY spoke of the need for understanding treatment of child offenders.

Criticism of the Silicosis Schemes

During the discussion of Home Office subjects on March 5th, Mr. A. HOLLINS said workers engaged in industries where silicosis developed would prefer that silicosis should be scheduled as an industrial disease. At present it was only covered under Section 47 of the 1925 Act, which scheduled the occupation and not the disease. Only those working in the scheduled occupation could obtain compensation. His friends contended that any workman who contracted this disease should be allowed to claim compensation. They also thought it would be possible to retain the present advantage whereby a claimant went to a medical board with the possibility of a second, or even a third opinion, instead of only to a certifying surgeon and a medical referee as under Section 43 of the Act. In the pottery industry the boards were working in a perfectly satisfactory manner.

Mr. J. J. TINKER spoke of how men who had suffered from nystagmus concealed the fact when applying for work at a colliery. He alleged that men felt injustice when their cases were taken from a certifying surgeon to a medical referee. The workmen's compensation statistics for 1934, issued by the Home Office, showed that 1,255 out of 1,961 appeals to the medical referee were confirmed, and sixty-six of the 102 appeals by workmen. On many occasions the medical referee had been casual in his examination. His friends thought that at least three men should judge these cases. Mr. ALFRED SHORT called attention to the increasing accident rate among young people unaccustomed to factory life. There should be personal instruction, and greater care should be taken of transmitting machinery. There were too many accidents in hoists and lifts, many of which were out of date. More factory workers were required. He also asked if the Home Office was collaborating in the investigation which he understood was being made into carbon monoxide poisoning from petrol fumes. Drivers and other workers employed on petrol-driven omnibuses suffered from gastric complaints from inhaling these fumes.

Sir ARNOLD WILSON said compensation was not enough in cases of silicosis, nystagmus, dermatitis, and so on. The men should be reconditioned and made fit for some other trade. Turning to workmen's compensation he said he believed that 15 per cent. of the premiums paid was expended on legal and medical expenses in settlement of claims. Mr. R. J. TAYLOR stated that in a colliery he knew which worked with naked lights nystagmus never occurred. That colliery closed. Practically every man got work at a new colliery where electric lamps were used. Nystagmus soon developed among them and increased from year to year. When men once had

nystagmus medical referees might certify them as fit to work, but colliery managements took no risks with such men. Mr. RHYS DAVIES said the incidence of silicosis continued serious and widespread. The medical profession by this time ought to be able to diagnose silicosis as well as it diagnosed Bright's disease.

Mr. GEOFFREY LLOYD replied that the Government would look carefully into the points raised on workmen's compensation, and in particular on miners' nystagmus. A committee was sitting on the matter. Facts made it inappropriate to deal with silicosis under the provisions and schedules for industrial disease. It progressed slowly and was difficult to diagnose. No ordinary doctor could tell with any degree of certainty whether a particular man was suffering from silicosis or some other pulmonary disease. Elaborate medical machinery, including a medical board and the most expert skill of the radiographer, was necessary to show this beyond doubt. The Government felt it was unwise to scrap the complex system of silicosis schemes. It was better to go on experimenting and making researches. It was ready to examine evidence on the occurrence of the disease in other occupations or other circumstances, and so in time to improve the scheme. At present a number of investigations were being made into silicosis, and the Medical Research Council was at work on the subject. The prevention of silicosis was receiving attention from the Home Office. The main principle was the suppression of dust by exhaust ventilation by putting water on the material and by use of respirators. The Home Office thought it had a simpler and better type of respirator. A good deal was done in certain industries by elimination of silicosis material.

Training Doctors in Treatment of Poison Gas Casualties

On March 5th, during a debate on home affairs, Mr. E. D. SANDYS stated that he had been approached by medical practitioners who said that in the event of an air raid with gas attack a large part of the duties of providing relief and first-aid assistance to the victims would fall upon them, and yet they were not in a position to carry out these duties. The majority of doctors to-day had no knowledge whatever regarding the treatment of poison gas cases. Doctors who took part in the war had acquired knowledge of a number of gases then used, but since then the range of poison gas had developed, and a whole generation of doctors had appeared who had no knowledge or training in treatment of these cases. It did not form part of the regular curriculum of a medical practitioner training for his degree. Mr. Sandys asked whether the Home Office was considering measures to provide courses of instruction for doctors in treatment of gas cases, and also preparing directions for doctors not only in treatment of poison gas cases, but how they should render first aid at the moment of the air attack. Was the Home Office making arrangements to provide all medical practitioners with suitable gas masks and gas-proof suits and outfits to enable a doctor in a gas attack to go on to the streets and bring in the victims of the attack? Mr. GEOFFREY LLOYD assured Mr. Sandys that the Home Office had not overlooked the importance of associating the medical profession with air raid precautions. The department was in touch with medical officers of health all over the country in connexion with the medical aspects of air raid precaution schemes, and a doctor had recently been appointed to the staff of the Air Raids Precautions Department. Lectures had been arranged with the British Medical Association to interest general practitioners in the problem, and the Department was in touch with the medical officers attached to the Ministry of Health. A doctor had been attached to the staff of the Anti-Gas School.

In a further answer to Mr. Sandys, on March 9th, Mr. GEOFFREY LLOYD said he could not state what percentage of medical practitioners in the United Kingdom had gone through a course of study in the treatment of the various types of poison gas cases. Apart from doctors who had been attached at some time to one of the Defence Services, comparatively few medical practitioners in this country had received specific training in the treatment of gas casualties. It was hoped to provide a certain number of courses for doctors at the civilian anti-gas school which would be opened shortly, but this was not regarded as an adequate solution of the problem, and it was proposed to discuss the position with the authorities responsible for medical education. Mr. Lloyd added that he could not say at present when he would be able to make a full statement of the steps considered necessary.

Maternal Mortality in the Rhondda Valley

Mr. WILFRID ROBERTS, on March 5th, asked if the attention of the Minister of Health had been called to figures and graphs showing the reduction of maternal mortality in the Rhondda Valley as the result of the provision of additional meals as well as milk to expectant mothers. Sir KINGSLEY WOOD, in reply, said he had asked the medical officers of his Department who were investigating maternal mortality to pay careful attention to the information regarding Rhondda to which Mr. Roberts referred. These officers would deal with it in their report when they had completed, later in the year, the extensive inquiry they were making. The report would be presented to Parliament as soon as received. Answering a further question by Sir Francis Fremantle, Sir Kingsley said the report would not be published before the House of Commons discussed the Maternity Bill which was to be introduced.

Licensing Hours

The second reading of the Licensing (Amendment) Bill was moved in the House of Commons on March 6th by Mr. G. GLEDHILL. The Bill proposed to alter the laws regulating the sale of liquor in clubs, and further to standardize the hours of sale on licensed premises.

Dr. SALTER, in moving its rejection, said there had been a tremendous change for the better in the condition of the streets since shorter hours were imposed for the sale of drink, but the Bill would lengthen hours, a step which in 1935 was taken in Manchester, and was followed by an increase in convictions for drunkenness. In Salford, where the magistrates refused to lengthen the hours, the convictions decreased. There had been an increase in the consumption of liquor since 1932, which was accompanied by an increase in the convictions of parents for cruelty to children due to drink. The Bill proposed to go back to the state of things thirty years ago, when in the poor boroughs of London no doctor dare go to bed on Saturday night before 3 a.m. because of drunken brawls in the street.

Sir JOHN SIMON promised that the Government would bring in next session a Bill to deal with bogus clubs.

On this assurance Mr. Gledhill withdrew the Bill.

Children in Special Schools.—Mr. OLIVER STANLEY furnished on March 3rd the following table of the number of physically and mentally defective children on the rolls of special schools in England and Wales on March 31st in each of the years 1932, 1933, 1934, and 1935.

Year.	Physically Defective Children.	Mentally Defective Children.
1932	28,095	15,628
1933	28,838	15,637
1934	28,884	15,318
1935	29,417	14,974

Water Supply and Sanitation in Schools.—Mr. OLIVER STANLEY regretted, on March 5th, that he could not state the number of schools in England and Wales which were not provided with an efficient water supply or proper sanitary equipment. He added that the water supply and sanitation for a school depended generally upon the arrangements which existed in the neighbourhood in which the school was situated. The Government inspectors gave attention to these matters when they inspected the schools. Cases of neglect and inadequacy were reported to the Board and appropriate action was taken.

Workmen's Compensation.—Sir JOHN SIMON announced on March 5th that formalities were being carried out for the ratification of the Workmen's Compensation (Occupational Diseases) Convention (Revised), 1934, No. 62. He saw no prospect of passing at present the legislation which would be necessary to permit the ratification of the Workmen's Compensation (Accidents) Convention, 1925 (No. 17).

Medical News

A general meeting of the Society of Medical Officers of Health will be held at 1, Thornhaugh Street, Russell Square, W.C., on Friday, March 20th, at 5.30 p.m., when there will be a discussion on "Nutritional Factors in the Prevention of Disease," to be opened by Professor S. J. Cowell, followed by Dr. G. C. M. M'Gonigle. Visitors are welcome at this meeting. At 8.30 p.m. there will be a meeting of the Maternity and Child Welfare Group of the society, at which Dr. Eric Pritchard will read a paper on "Neo-natal Mortality, its Causes, Prevention, and Treatment." Dr. Virginia Saunders-Jacobs will open the subsequent discussion.

A meeting of the Grenfell Association of Great Britain and Ireland will be held at Caxton Hall, Westminster, S.W., on Wednesday, March 18th, at 3 p.m., when Dr. Harry L. Paddon will speak on "Twenty-one Years with Sir Wilfred Grenfell in Labrador." Lord Horder will be in the chair.

Dr. E. K. Le Fleming, Chairman of Council of the British Medical Association, will be one of the speakers at an Easter week-end study school, arranged by the National Institute of Industrial Psychology, to be held at Exeter College, Oxford, from April 9th to 13th, when the subject of study will be "Problems of Work and Leisure." Further information can be obtained from the secretary, National Institute of Industrial Psychology, Aldwych House, London, W.C.

A meeting will be held at the Princess Beatrice Hospital, Richmond Road, S.W., on Thursday, March 19th, at 8.45 p.m., when a demonstration of cases will be given by Dr. B. Buckley Sharp and other members of the staff. Short demonstrations on the treatment of prostatic obstruction will be given, by Mr. Kenneth Heritage, and on the Pavex treatment of vascular disease, by Mr. A. Lawrence Abel. Mr. Abel will also speak on surgical travels in North America.

A joint meeting of the Royal Microscopical Society and the Society of Chemical Industry (Food Group), will be held at the London School of Hygiene and Tropical Medicine, Keppel Street, W.C., on Wednesday, March 18th, at 4.30 p.m., when papers on the microscopy of foods will be read by Mr. Andrew More, Mr. J. E. Barnard, F.R.S., Mr. F. A. Hatch, and Mr. T. E. Wallis.

The University of London Animal Welfare Society has arranged a public lecture on "The Songs of Birds" by Professor Walter Garstang on Tuesday, March 17th, at 8 p.m., at Birkbeck College, Breams Buildings, E.C. The chair will be taken by Mr. C. E. M. Joad. Admission free, without ticket.

The annual meeting of the Mental After-Care Association will be held at Stationers' Hall, Ludgate Hill, E.C., on Wednesday, March 18th, at 3 p.m., with Viscount Wakefield of Hythe in the chair. The speakers will include Sir Hubert Bond, Dr. G. W. B. James, Dr. W. D. Nicol, Dr. J. F. E. Prideaux, and Dr. Reginald Worth.

A conference to discuss measures for combating malaria, convened by the Commissariat of Health of the Soviet Republic, was opened in Moscow on March 5th. The conference considered reports on the work done in the campaign against malaria in 1935 and the plan of work for 1936. The agenda also included discussion of a scheme for mass inspection of the population with a view to discovering malarial sufferers; also the use of synthetic preparations for malarial treatment, and how to combat malaria among children.

We are asked to state that hospitals situated within eleven miles of St. Paul's desiring to participate in the grants made by King Edward's Hospital Fund for London for the year 1936 must make application before the 31st instant to the Honorary Secretaries of the Fund at 10, Old Jewry, E.C.2 (G.P.O. Box 465A). Applications will also be considered from convalescent homes which are situated within the above area or which, being situated outside, take a large proportion of patients from London.

The Fellowship of Medicine announces that an M.R.C.P. class in chest and heart diseases will be given at the Royal Chest Hospital, March 16th to April 4th, on Mondays, Wednesdays, and Fridays from 8 p.m. to 10 p.m.; a demonstration of the fundus oculi for M.R.C.P. candidates will be given at the West End Hospital for Nervous Diseases on March 31st, at 8.30 p.m. Four lectures on diseases of children will be given at the National Temperance Hospital on March 25th, 27th, April 1st, and 3rd, at 8.30 p.m. Week-end courses include general medicine at the Miller Hospital, March 21st and 22nd; and urology at All Saints' Hospital, March 28th and 29th. Courses in April include infants diseases at the Infants Hospital, March 30th to April 4th, all day; proctology at St. Mark's Hospital, April 20th to 25th, all day; ophthalmology at the Royal Eye Hospital, April 20th to May 1st, afternoons; medicine, surgery, and gynaecology at the Royal Waterloo Hospital, April 27th to May 9th, all day; psychological medicine at Maudsley Hospital, April 27th to May 30th, afternoons; and a course on heart and lung diseases at the Victoria Park Hospital, April 18th and 19th. Courses and lectures are open only to members and associates of the Fellowship of Medicine, 1, Wimpole Street, W.1.

We are asked to announce that the post-graduate lecture by Dr. G. J. Langley at the Ancoats Hospital, Manchester, arranged for March 19th, has been cancelled.

The Exhibition of Women's Progress, in Sunderland House, Curzon Street, W., includes a display by the College of Nursing, illustrating progress in nursing during the last fifty years and the opportunities nurses now have for post-graduate training. The organizers of the exhibition hope to raise £1,000 for the Madame Curie Hospital for Women in Fitzjohn's Avenue, Hampstead.

The *Collected Scientific Papers of Sir William Bate Hardy, F.R.S.*, edited by Professor E. K. Rideal, are shortly to be published by the Cambridge University Press under the auspices of the Colloid Committee of the Faraday Society.

Letters, Notes, and Answers

All communications in regard to editorial business should be addressed to **The EDITOR, British Medical Journal, B.M.A. House, Tavistock Square, W.C.1.**

ORIGINAL ARTICLES and LETTERS forwarded for publication are understood to be offered to the *British Medical Journal* alone, unless the contrary be stated. Correspondents who wish notice to be taken of their communications should authenticate them with their names, not necessarily for publication.

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All communications with reference to ADVERTISEMENTS, as well as orders for copies of the *Journal*, should be addressed to the Financial Secretary and Business Manager.

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QUERIES AND ANSWERS

Hedge Nettle

Professor D. T. BARRY (University College, Cork) writes: I am much interested in the pharmacodynamic action of hedge nettle (*Stachys silvatica*). This plant is popular in different countries amongst unorthodox practitioners as an oxytocic agent. Is it well known as such generally or in particular districts in the British Isles?

Stammering

"CURED STAMMERER" writes in reply to "Old October" (*Journal*, February 29th, p. 455): The failure of courses of treatment, speech training, and similar methods to cure stammering is usually due to a misconception of the nature of the condition. Stammering is commonly regarded as a "defect" of speech or an "impediment" in speech, although it is well known that the stammerer has neither a defect nor an impediment, but can speak perfectly well on occasions. Stammering is one symptom of a general condition which is of the nature of an inferiority complex. This symptom is at the same time easy and difficult to cure. It is indispensable that the stammerer should strongly wish to be cured and should actively co-operate in all remedial procedure. If this condition can be obtained stammering is easy to cure, but without this condition the cure is difficult and almost impossible to obtain. It is of no avail to send a stammering boy to teachers. This frequently increases the self-consciousness and retards cure, especially if the teaching is done in a class with several pupils. On the other hand, if a stammerer goes voluntarily to a teacher without the knowledge of his parents and relatives he is likely to become cured. Thus it is that most cured stammerers are self-cured, and have little to say in favour of teachers, while quite willing to explain how they cured themselves. Stammering cannot be cured by an outside influence such as the prescriptions or directions of a physician, but there are several ways in which the stammerer who wishes to cure himself can be assisted. Of these the most important are distraction and suggestion. A stammerer will not stammer when his attention is removed from the problem of uttering words. Thus he will not stammer when singing, repeating poetry, imitating another's voice, or when his attention is distracted in many other ways. He can therefore be advised to speak slightly through his nose, to adopt a slightly recitative or sing-song manner, or to mimic the voice of some other person. He may carry some object in his left-hand trouser pocket and hold it while speaking, or may adopt any other similar means for distraction of attention, such as the traditional pebble in the mouth. Auto-suggestion is valuable, but hetero-suggestion less so. The stammerer may write on a piece of paper the words "I do not stammer. I do not need to stammer" several times, and paste this upon his looking-glass so that he sees it at least two or three times a day. He may also have these words printed or typed upon a piece of card, which he may carry in his pocket and hold when he is speaking. As regards hetero-suggestion, it should be tactfully indicated to the stammerer as frequently as possible that he is quite able to speak, and such expressions as "defect of speech" or "impediment in speech" should never be used in his hearing. In addition, breathing exercises, singing, and recitation should be taught. Elocution should be taught to everyone, whether stammerers or not. Games in which several people are engaged together should be encouraged, such as football, tennis, badminton, and similar sports. Solitary walks or recreations should be discouraged. Above all, it is necessary to emphasize again that the stammerer must have the "will to succeed" and must actively co-operate. Stammering usually becomes cured in the twenties, because it is about that time that the stammerer begins to be disillusioned about his "speech defect" becoming cured "in time" and the value of the instructions of teachers, and begins to realize the seriousness of his condition, and that he *himself* must do something about it.

Buccal Ulcers

Dr. R. D. MOYLE (Eastbourne) writes: "G.P.'s" query (February 29th, p. 455) brings up a subject which has interested me for some time, inasmuch as I have had several cases of this obstinate condition to treat and have searched the literature for years back for information. I have listed ten diseases associated in some way with this trouble. Four of them are definite skin diseases, and as "G.P." states that "the general condition of the patient is good and no abnormality has been discovered" one can probably dismiss these conditions, also, I think, embolic (bacterial) disease. The remaining five on my list are possibles. (1) Blood disease with anaemia, microcytic or macrocytic. "G.P.'s" remarks regarding the effect of iron and quinine suggest investigation in this direction. (2) Avitaminosis A, B, (1 and 2), C, D. In this connexion one can remember idiopathic steatorrhoea and/or sprue may be associated with buccal ulcers, also pellagra. (3) Hypochlorhydria or achlorhydria, with or without anaemia. (4) Brucella infection. Investigations along the above lines may be helpful in this case. I may also add that my last patient, after many attempts as outlined above, gave me spontaneously a history that once following influenza she had been free for the longest period in years. Taking up that suggestion I gave her inoculations of anti-influenza vaccine. She had injections weekly for four weeks, and now once a month. The ulcers healed, and she has remained free for four months to date.

"Verrucae"

Dr. D. D. MALPAS (Bournemouth) writes in reply to the query of "O. F. S." (*Journal*, February 29th, p. 455): I have treated these verrucae very successfully with *x* rays in many cases. If "O. F. S." cares to write to me I shall be pleased to tell him more about it.

Income Tax

Replacement of Car

"B. B." bought an "R." car in 1924 for £410; in 1931 he replaced it by an "H." car costing £450, less £30 received for the "R." car; and in May, 1935, replaced the "H." car by a "T." car costing £650, less £150 received for the "H." car. No depreciation has been claimed.

*** In 1931 a replacement deduction of £380 was obtained—the actual expenditure was £420, but of that £40 must be regarded as capital outlay in the improvement of the car equipment. In 1935 £650 – £150 = £500 was expended, but only £300 can be claimed as a reduction, the balance of £200 representing further capital outlay. So far "B. B." has not lost by not claiming depreciation because of the rising cost of his cars, and we advise him to claim the replacement for 1936–7 and depreciation for 1937–8 and future years. (He cannot claim depreciation for 1936–7, because the assessment for that year is affected by the replacement deduction.)

LETTERS, NOTES, ETC.

Care of the Perineum

Dr. D. RHODES ALLISON (East Yorks) writes: For some years I have advised an ante-natal measure to prevent perineal tears; it has the further advantage of shortening the second stage in labour in many cases. As it has been so uniformly successful I venture to submit an account of it. As is well known, during coitus there is an inverted sensibility to painful stimuli; particularly is this true where stretching of the vagina or vulval orifice is concerned. Equally important is the fact that the nervous mechanism allows increased elasticity at this time. My practice has been to instruct the husband to dilate the vaginal orifice digitally during coitus—beginning gradually but increasing the dilatation on successive occasions. If this is done properly—the method is only applicable to the more intelligent type of married couple—the elasticity becomes such that the passage of the foetal head causes little more stretching than has been obtained on previous occasions. I have never known the method fail, even in elderly primiparae, where one has had the co-operation of husband and wife. This is almost always forthcoming when one outlines the benefits which will certainly accrue. There is no damage to fibrous structures, and so no fear of producing a patulous vagina.

Corrigendum

The medical qualifications of Dr. G. Bruton Sweet of Auckland, N.Z., were incorrectly given in the correspondence section of the contents page of the *Journal* of December 28th, 1935. Dr. Bruton Sweet holds the degrees of M.B., Ch.M. of the University of Sydney.

Pulmonary Trauma: Correction

In the photogravure plate illustrating Dr. W. E. Cooke's article in last week's issue the photomicrographs in Fig. III were wrongly numbered. To conform with the plate the numbers in the text on page 462 (column two) should read: No. 4 for No. 2; No. 2 for No. 3; No. 5 for No. 4; No. 3 for No. 5—with the exception that in line thirteen No. 5 should be No. 2.

Vacancies

Notifications of offices vacant in universities, medical colleges, and of vacant resident and other appointments at hospitals, will be found at pages 54, 55, 56, 57, 58, 59, 60, 61, and 64 of our advertisement columns, and advertisements as to partnerships, assistantships, and locumtenencies at pages 62 and 63.

A short summary of vacant posts notified in the advertisement columns appears in the *Supplement* at page 108.